University of Alberta

Gender Differences for Children and Adults in Cognitive, Academic, Visual-motor, Emotional and Behavioural Functioning in a Clinic-Referred Population

by

Aspen Gowers ©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment
of the requirements for the degree of Master of Education

in

Counselling Psychology

Department of Educational Psychology

Edmonton, Alberta

Spring, 2007

Library and
Archives Canada

Published Heritage
Branch

395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque et
Archives Canada

Direction du
Patrimoine de l'édition

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence
ISBN: 978-0-494-29905-0
Our file Notre référence
ISBN: 978-0-494-29905-0

NOTICE:
The author has granted a non-exclusive license allowing Library and Archives Canada to reproduce, publish, archive, preserve, conserve, communicate to the public by telecommunication or on the Internet, loan, distribute and sell theses worldwide, for commercial or non-commercial purposes, in microform, paper, electronic and/or any other formats.

The author retains copyright ownership and moral rights in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

AVIS:
L'auteur a accordé une licence non exclusive permettant à la Bibliothèque et Archives Canada de reproduire, publier, archiver, sauvegarder, conserver, transmettre au public par télécommunication ou par l'Internet, prêter, distribuer et vendre des thèses partout dans le monde, à des fins commerciales ou autres, sur support microforme, papier, électronique et/ou autres formats.

L'auteur conserve la propriété du droit d'auteur et des droits moraux qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

In compliance with the Canadian Privacy Act some supporting forms may have been removed from this thesis.

While these forms may be included in the document page count, their removal does not represent any loss of content from the thesis.

Conformément à la loi canadienne sur la protection de la vie privée, quelques formulaires secondaires ont été enlevés de cette thèse.

Bien que ces formulaires aient inclus dans la pagination, il n'y aura aucun contenu manquant.

Canada

Abstract

The prevalence of gender differences is a controversial and politicized issue in society. There are many misconceptions about gender differences that have serious ramifications for our society and our gender identity development. This study looked at the gender differences in cognitive, academic, visual-motor and emotional and behavioural functioning among 401 clinic-referred participants who were administered a comprehensive psycho-educational assessment. The data were collected from the SBV, WISC-IV, WAIS-III, WIAT-II, WJ-III, WRAT-3, Beery VMI, Bender-Gestalt II, BAI, BDI-II, BASC and the BASC-2. There were minimal gender differences found in most areas of functioning, which is consistent with the literature in the field that supports the gender similarities hypothesis. When there were gender differences, males tended to have higher performance and relatively better emotional and behavioural functioning than females.

Acknowledgements

I would like to thank my family and friends for all their love, support and assistance through out all of my schooling. I would also like to thank Dr. Henry Janzen for his support, guidance and patience during the entire process of completing my thesis, as well as my supervisory committee, Dr. John Paterson, Dr. Carol Leroy, and Dr. George Buck for their kindness and support. Thank you everyone!

Table of Contents

CHAPTER 1: INTRODUCTION……1

Research Purpose and Objectives……4

Limitations and Delimitation……5

Study Overview……6

CHAPTER 2: LITERATURE REVIEW……7

Theoretical Perspectives on Gender Differences……8
  Biological theories……8
    Sociobiology theory……8
    Evolutionary theory……9
    Psychoanalytic theory……10
    Psychoanalytic feminism……11
  Psychological theories……12
    Social learning theory……12
    Cognitive development theory……13
    Gender lens/gender schema theory……14
  Social psychological theory……16
    Symbolic interactionalism……16
  Gender perspective……16

Gender Differences……18
  Cognitive Ability……18
  Academic Ability……24
  Visual Motor Integration……31
  Emotional and behaviour functioning……33
    Externalizing problems……36
    Internalizing problems……40

Summary and Implications……43

Hypotheses……44

CHAPTER 3: METHODOLOGY……46

Overview……46

Participants……46
  Participant Selection……46

Measures……48

Standford-Binet Intelligence Scales, Fifth Edition..........48
Wechsler Intelligence Scale for Children, Fourth Edition..........53
Wechsler Adult Intelligence Scale, Third Edition..........56
Wechsler Individual Achievement Test, Second Edition..........59
Woodcock-Johnson, Third Edition..........62
Wide Range Achievement Test, Third Edition..........64
Beery-Buktenica Developmental Test of Visual-Motor Integration, Fourth Edition, Revised..........67
Bender Visual-Motor Gestalt Test, Second Edition..........70
Beck's Anxiety Inventory..........72
Beck's Depression Inventory, Second Edition..........74
Behavior Assessment System for Children..........76
Behavior Assessment System for Children, Second Edition..........80

Procedures..........84
Data collection..........85

Data Analysis..........85

Limitations and Delimitation..........86
Limitations..........86
Delimitation..........88

CHAPTER 4: RESULTS..........90

Hypothesis 1..........90

Hypothesis 2..........92

Hypothesis 3..........95

Hypothesis 4..........96

Hypothesis 5..........107

Conclusions..........107

CHAPTER 5: DISCUSSION..........109

Gender Differences..........109
Summary of Research Findings..........109
Comparing the current findings to previous research..........115
Conclusions..........118

Issues for Treatment and Education..........121

REFERENCES..124

APPENDIX A...151

APPENDIX B...152

APPENDIX C...153

APPENDIX D...157

APPENDIX E...160

List of Tables

1 Descriptive Statistics for Each Sample......47

2 Statistics for the Verbal IQ Scores on the WAIS-III......91

3 Statistics for the Processing Speed Index Scores on the WSC-IV......92

4 Statistics for the Total Achievement Scores on the WJ-III......93

5 Statistics for the Writing Samples Scores on the WJ-III......94

6 Statistics for the Locus of Control Scores on the BASC-2-SRP......97

7 Statistics for the Relations with Parents Scores on the BASC-2-SRP......98

8 Statistics for the Personal Adjustment Scores on the BASC-2-SRP......99

9 Statistics for the Emotional Symptom Index on the BASC-2-SRP......99

10 Statistics for the Sensation Seeking Scores on the BASC-SRP......101

11 Statistics for the Somatization Scores on the BASC-SRP......101

12 Statistics for the Anxiety Scores on the BASC-TRS......103

13 Statistics for the Learning Problems on the BASC-TRS......103

14 Statistics for the Study Skills Scores on the BASC-TRS......104

15 Statistics for the Atypicality Scores on the BASC-2-TRS......106

16 Statistics for the Executive Functioning Scores on the BASC-2-TRS......106

17 Summary of the Gender Differences Found Using ANOVA......119

CHAPTER 1: INTRODUCTION

The issue of gender differences is a highly controversial and politicized issue in society (Halpern, 1992). It is important to study this issue in order to help develop an in-depth understanding of how males and females function in a variety of different areas. The study of this issue will also help raise public awareness and sensitivity, which may lead to the development of supports and services that are more adequate in meeting the specific needs of males and females. Additionally, the study of gender differences will hopefully help eliminate the stereotypes and misconceptions society holds about the differences between males and females. Many commonly held stereotypes have developed from these mistaken beliefs, which have serious ramifications for our society and our gender identity development. From these stereotypes, a considerable amount of societal pressure and expectations develop for males and females to act in accordance with society's views of masculinity and femininity. These expectations powerfully constrain our behaviour and limit how males and females will receive approval for acting in gender-appropriate ways (Nelson & Robinson, 1999).

There have been many research studies that have looked at gender differences in hopes of solidifying the differences between males and females in the areas of cognitive, academic, visual-motor and emotional and behavioural functioning. In general, previous research has shown minimal gender differences in cognitive ability, mostly because standardized intelligence measures are designed to reduce major gender differences in test performance (Vogel, 2001; Halpern & LaMay, 1992; Makintosh, 1996). Despite this attempt to minimize the differences between male and females on these measures, gender differences have been found in verbal, nonverbal, memory and spatial ability, as well as memory (Maccoby & Jacklin, 1974). Research has shown that females tend to have superior verbal ability and memory (Herlitz & Nilsson, 1998) and that males tend to have superior nonverbal and visual-spatial ability (Maccoby & Jacklin, 1974).

In the area of academic functioning, it has become widely accepted that males have a superior mathematical ability and females possess greater verbal facility (Beyer, 1995). Most of the research on gender differences has focused on male and female performance in the areas of mathematics and science while neglecting the academic areas that utilize verbal functioning, such as English and the social sciences.

Since visual motor integration (VMI) is a subgroup of visual-spatial abilities, there has been limited research conducted on gender differences in this specific area of functioning. Most of the research has focused on the differences between males' and females' visual-spatial functioning. One would hypothesize that males would have superior VMI ability compared to females because research has shown males to have superior visual-spatial abilities, however, females have been found to have a superior VMI ability from childhood through to adulthood (Vogel, 2001).

The issue of gender difference in emotional and behavioural functioning is among one of the most controversial and highly debated issues in society. In general, emotional and behavioural problems are dichotomized into two empirically established groups that either reflect internalizing types of problems (anxiety, depression, withdrawal, stress and eating disorders) or externalizing types of problems (aggression, oppositional behaviours, school problems and delinquency) (Achenbach, 1991). Research has shown that females tend to experience more internalizing types of emotions (such as shame, guilt, hurt, fear, and anxiety) (Brooks-Gunn & Peterson, 1991; Broberg, Ekeroth, Gustafsson, Hansson, Hägglöf, Ivarsson, & Larsson, 2001), whereas males tend to experience more externalizing emotions (such as aggression, hyperactivity and delinquency) (Broberg et al., 2001).

There have been many theoretical perspectives, including biological, psychological, social-psychological and gender-based theories that have been developed in an attempt to explain the origination of gender differences. Many of these theories (i.e., psychoanalytic and sociobiological) were developed many years ago and at the time were historically relevant, however, they are not applicable to our modern society. A gender-similarities hypothesis has been developed by Hyde (2005), which holds that males and females are similar on most psychological traits. In other words, males and females are more alike than they are different. To evaluate this hypothesis, Hyde collected data from 46 major meta-analyses that were conducted on psychological gender differences. There were six main categories of functioning that were assessed, including cognitive variables, social and personality variables, variables that assessed psychological well-being, motor behaviors and miscellaneous constructs. Overall, the extensive evidence from all the meta-analyses on gender differences supported Hyde's gender-similarities hypothesis. There were, however, a few notable exceptions, including some motor behaviors (e.g., throwing distance) and some aspects of sexuality, which did show large gender differences (Hyde, 2005). As well, it was found that aggression showed a moderate gender difference. "It is time to consider the costs of overinflated claims of gender differences. Arguably, they cause harm in numerous realms, including women's opportunities in the workplace, couple conflict and communication, and analyses of self-esteem problems among adolescents. Most important, these claims are not consistent with the scientific data" (Hyde, 2005, p. 590).

Research Purpose and Objectives

There is no literature currently available on the gender differences of a clinic-referred sample who had been administered the Stanford-Binet Intelligence Scales – Fifth Edition (SBV), Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV), Wechsler Adult Intelligence Scale – Third Edition (WAIS-III), Wechsler Individual Achievement Test – Second Edition (WIAT-II), Woodcock-Johnson – Third Edition (WJ III), Wide Range Achievement Test – Third Edition (WRAT-3), Beery-Buktenica Developmental Test of Visual-Motor Integration – Fourth Edition – Revised (Beery VMI), Bender Visual-Motor Gestalt Test – Second Edition (Bender-Gestalt II), Beck's Anxiety Inventory (BAI), Beck's Depression Inventory – Second Edition (BDI-II), Behavior Assessment System for Children (BASC) and Behavior Assessment System for Children – 2nd Edition (BASC-2). This study will be looking at the gender differences on the most commonly administered measures in a standardization test-battery for a psycho-educational assessment. Typically, most of the research has only addressed one particular area of functioning, whereas this study will be looking at a variety of areas of functioning, including cognitive, academic, visual-motor and emotional and behavioural. Additionally, this study will be using multiple-standardized measures for each area of functioning to determine if the results are consistent across assessment measures.

In the literature there is more discrepancy than consensus on the development and prevalence of gender differences, although there is growing evidence supporting Hyde's (2005) gender-similarities hypothesis. Still, this idea of gender similarity remains far from mainstream society. By looking at gender differences across a variety of areas of functioning, it is hoped that this study may add to the evidence supporting this gender- similarities hypothesis, as cognitive, academic, visual-motor functioning, and emotional and behavioural functioning have not yet been looked at in the literature in terms of this hypothesis.

Limitations and Delimitation

A limitation of this study is the variety of assessment tools that are available to the clinicians at the Education Clinic. Despite having a wide variety of assessment tools, there still remains a limit on the variety of tests available. For the purpose of this study, however, the tests available were more than adequate in representing the measures addressed in this study. Another limitation of this study is the variety of clinicians administering the tests across the assessments. Most clients were assessed by different clinicians and this inconsistency may have had an effect on the reliability and validity of the results. However, this effect is likely to be minimal because each of the assessment measures has standardized administration procedures, which ensures universal administration regardless of the administrator. This study is also limited by the inconsistent administration of assessment measures, which resulted in missing data from various subtests on the standardized assessment measures administered. To correct for this, as much as possible, this study used the assessment measures that were administered most consistently across each sample.

This study is delimited by the decision to use the data from the assessments conducted at the Education Clinic at the University of Alberta. These individuals were referred to the clinic for a variety of cognitive, academic, emotional and behavioural concerns, and as such, may not be considered a random sample, however, the results of this study are intended to apply only to clinic-referred individuals. Even though this sample may not be applicable to the general population, it may be indicative of individuals seen in treatment and assessment (Carlson, Shin, & Booth, 1999). As such, this study may provide important information concerning the assessment and research of clinic-referred children and adults.

Study Overview

Chapter II contains a review of the literature relevant to this study. First, a brief description of the theories on gender differences is provided, including a review of the main biological, psychological, social-psychological and gender-based theories. Second, a review of the literature on gender differences in cognitive, academic, visual-motor, and emotional and behavioural functioning is provided. These three topics are integrated, leading to the rationale of the study and generation of hypotheses.

Chapter III outlines the research design and the procedures used to answer these hypotheses. Descriptions of the participants, assessment tools, procedures and statistical analyses used in this study are provided. Study limitations and delimitations are also outlined.

Chapter IV presents the results of this study, organized by research question. A discussion of these results is presented in Chapter V, along with implication of the study and suggestions for future research.

CHAPTER 2: LITERATURE REVIEW

Gender differences, their magnitudes, and their causes and consequences are a controversial and politicized issue in society (Halpern, 1992). There is constant discussion and debate about the differences between males and females, which generate many misconceptions about gender differences. Many stereotypes have developed from these mistaken beliefs and can have serious ramifications for our society and for gender-identity development. The definition of gender refers to the designation of all thoughts, emotions and behaviours that are associated with femininity and masculinity (Nelson & Robinson, 1999). Such societal definitions have led to commonly-held beliefs about males and females, which have powerful consequences (Nelson & Robinson). These consequences can be self-perpetuating because "(w)hen translated into expectations for gender-appropriate behaviour, constraints and limitations are placed not only upon the actions of women and men from birth onwards, but also upon our ability to conceive of alternatives to our present-day understandings of both sex and gender" (Nelson & Robinson, p. 17). DeLisi and Soundranayagam (1990) found that the main traits associated with femininity are along the continuum of niceness and nurturance, whereas the main traits associated with masculinity are along the dimensions of potency and power. By holding these beliefs, society consequently expects and pressures males and females to possess such qualities. These expectations, in turn, "powerfully constrain gender behaviour by prescriptively limiting how women and men will receive approval for acting in gender-appropriate ways. Departures from stereotyped expectations are judged deviant and labeled as either unmasculine (or effeminate) or unfeminine (or masculine)" (Nelson & Robinson, 1999, p. 21). The following is a brief overview of the different theoretical perspectives on the development of gender differences.

Theoretical perspectives on gender differences

Theoretical perspectives on the origination of gender differences propose many reasons why males and females differ in several areas of functioning. Following is a brief description of the different perspectives, including biological, psychological, social-psychological and gender-based theories.

Biological Theories

Biological theories are based in the foundations of biology and argue that gender differences are fundamentally a product of our human biological nature (Henslin & Nelson, 1996). In other words, this perspective states that our biological sex determines our gender.

Sociobiology theory

Sociobiology is defined as "the systematic study of the biological basis of all forms of social behaviour" (Wilson, 1978, p. 16). This theoretical perspective states that individuals are structured by nature and that our behaviour is motivated by an innate desire to ensure that our genes are passed on to future generations (Lindsay, 1994). As a result of this innate motivation, certain behaviours, such as aggressiveness and territoriality, are thought to improve the reproductive success of those who exhibit them and have therefore become genetically encoded within our species. This principle is referred to as Darwinism and reflects the philosophy of "survival-of-the-fittest natural selection" (Nelson & Robinson, 1999, p. 55). Sociobiology theory also believes that the concept of parental investment, which involves the actions taken by parents to ensure a child's survival, is the reason why women in most societies tend to care for children. This theoretical perspective states that women have more investment in the survival of a child because of their greater contribution to the child from the moment of conception. Women have a finite number of eggs and only one is available each month, whereas men produce sperm continuously, therefore it makes sense from a sociobiological perspective that men would want to impregnate as many women as possible to ensure their genes will be passed on to subsequent generations. Conversely, women must be careful in selecting a mate in order to find the best partner with whom to intermix her genes. Overall, this theoretical perspective states that gender differences are a result of the biological differences between males and females, which in turn translates into social differences.

Evolutionary theory

This theoretical perspective states that males and females are identical in evolutionary terms except for the strategies they use to ensure the survival of their sperm and eggs (Nelson & Robinson, 1999). The evolutionary perspective, therefore, is limited to explaining gender differences based on the different sexual strategies males and females use in their respective mating rituals. These mating strategies parallel what the sociobiological perspective states -- that for men to have the most opportunity to pass on their genes, they need to spread their sperm to as many women as possible. Women, on the other hand, must be more selective in who they choose as a mate and would want to find the best possible suitor with whom to intermix their genes. Overall, this theoretical perspective asserts that gender identity has a biological basis and males and females differ as a result of their different sexual seduction strategies.

Psychoanalytic theory

According to the psychoanalytic perspective, "anatomy is destiny" (Nelson & Robinson, 1999, p. 60). This theoretical perspective states that individuals experience thoughts and feelings at both a conscious and unconsciousness level (Nelson & Robinson) and that we are mainly governed by the instincts of sexuality and aggression. These instincts are fueled by the libido (the instinctual craving for sensual pleasure), which is the main motivational factor for our behaviour in childhood. During childhood, this perspective asserts that individuals pass through five developmental stages: oral, anal, phallic, latency and genital and at each of the developmental stages, the libido becomes centered at a different erogenous area of the body that is sensitive to sensual stimulation. In the oral stage (0-2 years old) the libido is centered at the mouth and during the anal stage (3 years old) the center for sexual energy and gratification is derived from the region of the anus. During the phallic stage, the libido is centered at the genitals. The phallic stage is also where males and females begin to diverge and follow different developmental pathways. According to this theoretical perspective, the male's developmental pathway stems from the Oedipal complex and the female's developmental pathway stems from the Electra complex. "During the Oedipus complex, the boy is intensely attached to his mother and resents the presence of his father, whom he unconsciously perceives to be a rival for his mother's sexual and nonsexual affections" (Nelson & Robinson, p. 60). During this stage of development, males also develop a fear of being castrated by their fathers.

This anxiety stems from the belief that because of the intense attachment they have to their mothers, their fathers will retaliate and remove their source of sexual pleasure. Psychoanalytic theory asserts that during this stage of development, males begin to believe their penis is a superior sexual organ, therefore, making women inferior because they do not possess a penis. Females, on the other hand, experience the Electra complex, where they realize that they do not possess a penis and develop unconscious feelings of inferiority and envy of men. According to this theoretical perspective, females are never able to fully resolve the Electra complex because they cannot ever possess a penis and males' Oedipus complex is resolved by the identification process with their father figure. Overall, this theoretical perspective believes that females are motivated by envy, which is seen as more powerful than the fear experienced by males. The next stage of development is the latency stage, where sexual impulses subside and both males and females focus on nonsexual interests. The final stage of development is the genital stage where the libido is centered in the genital area. At this stage, males and females direct their sexual interests towards heterosexuality, although this perspective does acknowledge the possibility of homosexuality and bisexuality (Lee & Hertzberg, 1978). Overall, this theoretical perspective claims that gender differences result from the biological differences between males and females, in addition to the sex-linked forms in which genital sexuality is expressed (Nelson & Robinson, 1999).

Psychoanalytic feminism

Psychoanalytic feminism has mainly been established by feminists and is based on object relations' theory (Nelson & Robinson, 1999). This theoretical perspective believes that psychoanalytic theory was the product of a patriarchal society. According to this perspective, the social environment influences the experiences of children living in a certain time and place and also certain events early in our childhood shape our adult personalities, such as the parenting process. For example, one of this perspective's assertions is that mothers who care for their children produce daughters who want to become mothers and sons who dominate and devalue women. Mainly, this theoretical perspective believes that gender differences are a result of the different roles mothers and fathers play in the parenting process.

Psychological Theories

These theories are based in psychology and focus mainly on the different sex-typing of males and females (Nelson & Robinson, 1999). "The acquisition of sex-appropriate preferences, skills, personality attributes, behaviours, and self-concept is typically referred to within psychology as the process of 'sex typing' (Bem, 1983, p. 83).

Social-learning theory

According to social-learning theory, behaviour is determined by consequences and people learn gender behaviour similar to any other social behaviour (Nelson & Robinson, 1999). Learning gender behaviour involves two main processes: direct reinforcement and modeling. Direct reinforcement involves the reinforcement of gender-appropriate behaviours and the punishment of gender-inappropriate behaviours. The belief is that people will repeat behaviours that have positive consequences, such as praise and gifts, and cease to engage in behaviours that have negative consequences, such as criticism, anger and the removal of privileges. The second process is modeling, which involves either direct imitation or observational learning. Direct imitation is when an individual immediately patterns his or her behaviour after the model's behaviour. Observational learning is when an individual observes a model's behaviour and the subsequent consequences, but imitates the behavior at a later time. In learning gender behaviour, this perspective asserts that children's parents, their environment and the media, either directly or indirectly reinforce or punish feminine and masculine behaviour in males and females. Additionally, this perspective purports that children tend to imitate their same-sex parents and adults, which explains how children begin to imitate more subtle aspects of gender behaviour. It has been shown that parents treat males and females differently and also reinforce them differently for exhibiting the same behaviour (Sherman, 1978). Overall, this theoretical perspective asserts that gender differences are a result of the social environment or modeling exhibited by males and females in society.

Cognitive development theory

Cognitive development theory states that children learn differently, dependent on the thinking ability of the individual at a particular point in time (Nelson & Robinson, 1999). An individual's understanding of gender behaviour is therefore based on his or her developmentally-changing cognitions of gender identity. According to this theoretical perspective, gender identity is acquired between the ages of eighteen months and three years, as part of an individual's attempt to understand the world. This is seen as a rudimentary gender identity because it is based on visual cues, such as hair length and clothing. In this stage of development, a child believes that visual cues are what constitute gender and if a male puts on a dress, he will become female. Once a child learns the principle conversion despite transformation "(i.e., despite superficial changes, underlying features remain the same – such as the constancy of water volume despite changes in the shape of a container)" (Nelson & Robinson, p. 70), he or she understands that gender is unchangeable, which is called gender consistency. This awareness is usually acquired around the age of five or six and is important because it provides an individual with the understanding that whatever his or her gender identity, it will remain consistent regardless of any superficial changes that may occur. Once a child understands this principle, his or her gender identity becomes central to his or her self-concept. The next stage of development involves self-socialization, where a child seeks out behaviour that is consistent with his or her understanding of gender (Kholberg, 1966). It is during this stage of development that gender stereotypes about appropriate male and female behaviours, as well as societal evaluations of males and females, are acquired (Nelson & Robinson, 1999). These gender stereotypes are thought to facilitate our gender socialization process and provide information for subsequent gender behaviour. Males are said to have an easier time with gender socialization because our society values more masculine traits. Overall, this theoretical perspective states that the basis of gender differences lie in males and females' different cognitive development processes.

Gender lens/gender schema theory

According to the gender lens/gender schema theory, cultures are based upon a limited number of assumptions or "lenses" that shape society's conception of gender

(Nelson & Robinson, 1999). In western societies, there are three main gender lenses that govern our perceptions: polarization, androcentrism and biological essentialism. Polarization refers to the dichotomy of the sexes and androcentrism refers to the belief that males are superior and that their ways of being are normative. Biological essentialism refers to the fact that polarization and androcentrism are inevitable by-products of inherent differences between the sexes (Bem, 1993). This theoretical perspective also believes that gender is developed from schemas, which are information-processing systems that guide and organize our perceptual processes about society. These schemas are thought to evolve in societies where sex dichotomies are emphasized and in general, there is very little within in our societies that are gender neutral or gender irrelevant (Nelson & Robinson, 1999). Once gender schemas are formed, they create a state of readiness within individuals to organize and understand all subsequent information about their external world, in terms of its apparent male or female and masculine or feminine properties (Bem, 1983). Once gender schemas are developed, it is believed that they provide an avenue for individuals to evaluate themselves as either masculine or feminine, which perpetuates gender differences within society (Nelson & Robinson, 1999). In sum, this theoretical perspective believes that gender differences result from our socialization process, where males and females are socialized differently because of our preconceived notions and assumptions about gender.

Social Psychological Theory

This theory was developed within the field of sociology and, similar to the psychological theories, focuses on the process of becoming gendered as opposed to the actual content of gender (Nelson & Robinson, 1999).

Symbolic interactionalism

Symbolic interactionalism theory asserts that behaviour is basically symbolic behaviour, meaning that it represents something else (Nelson & Robinson, 1999). According to this theory, symbols are assigned meaning and are responded to in accordance to their meanings through the interaction of individuals over a period of time. This occurs through role-taking, which is when an individual imaginatively assumes the point of view of another (Lindesmith & Strauss, 1968). This theoretical perspective also argues that through the process of role-taking, socialization occurs, which then contributes to the development of a sense of self (Nelson & Robinson, 1999). Furthermore, through role-taking, one learns to see him or herself as other people see him or her and subsequently internalizes these perceptions. Overall, this theoretical perspective asserts that gender differences are a result of the interactions between people, as well as from the different meanings our society gives to the word "male" and "female".

Gender perspective

This theoretical perspective is based on social constructionism and was developed by feminists in reaction to the social-psychological theories that emphasize the role of socialization in gender development (Nelson & Robinson, 1999). Despite the possibility of more than two sexes and genders, our society has chosen to only have two genders and sexes: male and female. "The gender perspective argues that apparent sex and gender differences are not the product of individual properties, but rather the product of ongoing multilevel social construction and reconstruction processes" (Nelson & Robinson, p.77). According to this perspective, there are four distinct levels at which the construction and reconstruction processes occur: sociocultural, institutional, interactional and individual (Ferree, 1990; Thompson, 1993). The sociocultural level includes the systems of meaning, our values, beliefs and ideologies that pertain to gender (Nelson & Robinson, 1999). The institutional level is informed by the sociocultural environment and is the fundamental structure for our society. The gender perspective asserts that the institutions in our society, such as the economy, family and religion, are structured to differentially reinforce specific gender behaviour. The interactional level addresses the everyday interactions and situations that shape gendered actions, thoughts and feelings of both males and females. At this level, social expectations combine with practical situational demands and constraints to either promote or restrict an individual's gendered self (Nelson & Robinson). The individual level focuses on the form and shape of gender identity, consciousness and behaviour (Thompson, 1993). Overall, the basic assumption of the gender perspective is that "(i)ndividual men and women construct their gender through interacting with other gendered beings in the situational contexts of basic institutions within a particular society possessing a particular culture at a particular point in historical time" (Nelson & Robinson, 1999, p. 79).

Gender Differences

In reviewing the literature, there was more discrepancy than consensus found on the development and prevalence of gender differences. Hyde (2005) examined the results of 46 meta-analysis studies that investigated gender differences in many areas of functioning. The findings supported the gender-similarities hypothesis that says males and females are more similar than different along most psychological traits. “The gender-similarities hypothesis holds that males and females are similar on most, but not all, psychological variables. That is, men and women, as well as boys and girls, are more alike than they are different” (Hyde, p. 581). The following is an overview of the literature that has examined the gender differences in cognitive, academic, visual-motor, and emotional and behavioural functioning.

Cognitive ability

The issue of gender differences in cognitive ability is controversial with potentially serious ramifications for our society, so much so that psychologists and others have argued against the study of sex differences (Hare-Mustin & Marecek, 1994; Hollway, 1994). Although, without doing research into this highly controversial topic, there would be no avenue for open inquiry into the discovery of which commonly-held beliefs about the differences and similarities between males and females are based in fact (Halpren & LaMay, 2000). When looking at gender differences in cognitive ability, it is important to keep in mind that females and males tend to have different values and interests and therefore engage in different activities. As a result, it would be expected that males and females possess different levels of knowledge about different subject areas. Questions about intelligence are rooted in sociopolitical ideologies, therefore, it should be noted that the way researchers and our society interpret the data is dependent on our personal beliefs (Halpren & LaMay, 2000). As well, gender differences on standardized intelligence tests are usually quite minimal because these tests are designed to reduce major gender differences in test performance (Vogel, 2001; Halpern & LaMay, 1992; Makintosh, 1996). During standardization procedures, male and female scores are equalized by eliminating questions that show a large advantage for either sex (Halpren & LaMay, 2000). Full Scale Intelligence Quotient (FSIQ) scores therefore represent an average of heterogeneous subtests.

Even though there are generally no gender differences in IQ scores, gender differences on some of the subtests still remain, which suggests that males and females do differ on some of the abilities assessed by intelligence tests. The largest gender differences in cognitive ability have been found at the extreme ends of IQ distributions, with males overrepresented in some types of mental retardation, learning disabilities, and language disorders (DeFries & Gillis, 1993; Henning-Stout & Close-Conoley, 1992). An extensive review of the literature on general intellectual ability was conducted by Maccoby and Jacklin (1974) and in the majority of the studies (70%) no gender differences were found on Full Scale IQ scores. There were, however, gender differences found in verbal, nonverbal and spatial intellectual ability; females tended to have superior verbally ability, whereas males tended to have superior nonverbal and visual-spatial abilities.

Visual spatial and nonverbal abilities

When Maccoby and Jacklin (1974) reviewed meta-analyses that assessed nonverbal and visual-spatial abilities, it was found that males tend to have superior visual-spatial and nonverbal abilities. These differences were found to develop in adolescence and continue on through adulthood (Trafton & Garrison, 1982). One of the main findings in the area of cognitive functioning is that males show higher spatial-abilities on test performance (McGee, 1979; Halpern, 1992; Maccoby & Jacklin, 1974). Spatial abilities, including spatial visualization and mental-rotation ability, are important for technical professions and for academic subjects like mathematics, chemistry and computer science. Another frequently cited difference between males and females is in the ability to transform a visual-spatial image in working memory. There are five qualitatively different types of visual-spatial abilities: spatial perception, mental rotation, spatial visualization, spatiotemporal ability and generation and maintenance of spatial image (Halpren & LaMay, 2000). Spatial perception involves the ability to locate either the horizontal or the vertical plane in a stationary display while ignoring distracting information. Mental rotation requires the ability to imagine how objects will appear when they are rotated in either a two- or three-dimensional space and is believed to be a measure of general spatial-reasoning ability (Casey, Nuttall, Pezaris, & Benbow, 1995). Spatial visualization is a multi-step and analytical process of spatial information and spatiotemporal ability refers to the judgments about, and responses to, dynamic visual displays. The generation and maintenance of a spatial image involves the ability to generate an image from long- or short-term memory, such as the shape of a particular letter of the alphabet, and then use the information in the image to perform a specified cognitive task. In a meta-analytical study that reviewed 286 studies (Voyer, Voyer & Bryden, 1995), males were found to perform better on these spatial tasks, with the exception of spatial visualization. Spatiotemporal tasks and generation and maintenance tasks were not included in these meta-analyses, however, gender differences on these tasks are similar in magnitude to those reported for mental rotation (Loring-Meier & Halpern, 1999). The gender differences in visual-spatial functioning are less likely due to life experience because they appear early in life (Halpren & LaMay, 2000). This advantage in transforming information in a visual-spatial working memory can be seen as early as it can be tested, by age three (Robinson, Abbott, Berninger, & Busse, 1996).

Verbal and memory abilities

Females tend to excel at tasks that require verbal ability and memory. If we look at memory in general, research has shown that females tend to have better memory ability compared to males. Memory can be separated into two different categories, episodic (memory for events in one's own life) and semantic (general memory for facts) and research shows that females tend to have better episodic memory than males (Herlitz, & Nilsson, 1998). In addition to memory, females tend to excel in language usage, including spelling (Stanley, Benbow, Brody, Dauber, & Lupkowski, 1992), reading comprehension (Hedges and Newell, 1995) and writing (U.S. Department of Education, 1997). Of all the cognitive differences, the gender gap in verbal ability is among the first to appear developmentally (Halpren & LaMay, 2003). Research has shown that females aged one to five years are more proficient in language skills than their male counterparts (McGuiness, 1976; Smolak, 1986). There is also some evidence that girls may talk about one month earlier and produce longer utterances than boys (Gazzaniga, Ivry, & Mangun, 1998; Shucard, Shucard, & Thomas, 1987). There have also been significant gender differences found in the rate of vocabulary growth during the toddler years. On average, there is a 13-word difference in vocabulary size between males and females at 16 months of age, a 51-word difference at 20 months, and a 115-word difference at 24 months (Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991). It has been concluded that these "gender differences in early vocabulary growth seem to reflect early capacity differences" (Huttenlocher et al., p. 245). Maccoby and Jacklin (1974) reviewed studies that assessed verbal intellectual ability. Few of these studies (38%) found no significant gender differences and most (74%) of the studies found female verbal superiority. In another meta-analysis, conducted by Hyde and Linn (1988) that looked at gender differences in verbal ability, it was concluded that “the gender difference in verbal ability is currently so small that it can be considered to be zero” (p. 64). As well, there was little evidence of consistent age trends in gender differences. There were subskills of verbal ability that showed larger differences. These subskills included spelling and language use and tended to favor females from grades 8 through 12 (Stanley, Benbow, Brody, Dauber, & Lupkowski 1992). McGuinness (1985) looked at gender differences specifically on the Wechsler’s tests and found no gender differences on the Verbal Intelligence Quotient (VIQ), Performance Intelligence Quotient (PIQ), and FSIQ scales. Despite these gender differences, it has been concluded that verbal ability is tenuous, and is based on the age and the measure of verbal performance being used (Maccoby & Jacklin, 1974).

Cognitive gender differences throughout the lifetime

As males and females age, their intellectual functioning will inevitably change. To what extent do gender differences in cognitive functioning remain through the aging process? Research that looked at the relationship between age and gender in relation to intellectual abilities over time, found that verbal intellectual abilities remained consistent, whereas performance intellectual abilities steadily declined over time (Kaufman, McLean, & Reynolds, 1989). Meinz and Salthouse (1998) examined data from numerous studies that compared cognitive abilities in old age with that of younger adults. The results showed that, in general, the older age group displayed many of the same gender patterns in cognitive abilities that have been previously reported with the younger age groups, such as visual-spatial, verbal and non-verbal ability, and memory. Overall, it was found that older men scored considerably better on spatial tasks compared to older women, whereas older women showed a higher ability on memory tasks. Another study found that older women perform better compared to older men on several different verbal learning/remembering tasks, name-face associations, the grocery-list selective reminding task, first-last name associative learning (Larrabee & Crook, 1993), memory for spatial locations (Eals & Silverman, 1994) and associative memory tasks (Birenbaum, Kelly, & Levi-Keren, 1994).

Cognitive abilities in individuals who present with a learning disability (LD)

Gender differences have also been found among individuals who present with a learning disability, most of whom are male (Shalev & Gross-Tsur, 2001). When looking at gender differences in the cognitive functioning of such individuals, females who are placed in a learning disabilities' program tend to be lower-functioning than their male counterparts (Vogel, 2001). The research has also shown that females receiving services for learning disabilities had a lower FSIQ compared to males (Eno & Woehlke, 1980; Ryckman, 1981). It was also found that males with a learning disability had a higher VIQ (Eno & Woehlke, 1980; Levin & Fuller, 1972; Ryckman, 1981), as well as a higher PIQ (Eno & Woehlke, 1980; Tittemore, Lawson, & Inglis, 1985) compared to females with a learning disability. A study conducted by Tittemore, Lawson, & Inglis (1985) found that on the Wechsler Intelligence Scale of Children – Revised (WISC-R), males with a learning disability performed worse than their female counterparts on the verbal subtests, however, females demonstrated a more-generalized cognitive impairment. Overall, gender differences of males and females who present with a learning disability resembled their normal achieving counterparts in most areas of cognitive functioning (Vogel, 2001).

Academic ability

"Males and females are inculcated from a young age that males possess more mathematics ability than females, whereas females supposedly have greater verbal facility" (Beyer, 1995, p. 3). Recent research has found that gender stereotypes regarding academic abilities and occupational choices are inaccurate (Beyer, 1995). These inaccuracies have the potential to become harmful because such gender stereotypes may be internalized and subsequently have a negative effect on females' expectancies and self-evaluations of performance on "masculine" tasks, and vice versa (Beyer, 1990; Beyer & Bowden, 1997). Given the prevalence of these negative stereotypes and low self-perceptions of ability on "masculine" tasks, it is therefore not surprising that in "masculine domains," such as mathematics and sciences, females, in comparison with males, tend to attribute their success to hard work rather than ability, and attribute failure to a lack of ability (Birenbaum & Kraemer, 1995; Gilbert, 1996; Rosenfield & Stephan, 1978). Furthermore, research has demonstrated that the gender gap in academic achievement in certain areas may be a result of general cognitive processes that are more amenable than previously thought (Aronson, Lustina, Good, Keough, Steele, & Brown, 1999; Aronson, Quinn, & Spencer, 1998; Spencer, Steele, & Quinn, 1999; Steele, 1997; Steele & Aronson, 1995; Steele, Spencer, & Aaronson, 2002). "Specifically, this research suggests that individuals may suffer negative performance outcomes (lower standardized test scores and less engagement with academics) because they are burdened by the prospect of confirming cultural stereotypes impugning their intellectual and academic abilities" (Good, Aronson, & Inzlicht, 2003, p. 647).

Mathematical ability

Gender differences in most cognitive areas are receding, however, the differences in mathematical ability favoring males still remains (Feingold 1988; Hyde, Fennema, & Lamon 1990; Hyde, Fennema, Ryan, Frost, & Hopp 1990; Hyde 1990). Males and females' mathematical performance tends to be similar in elementary school (Fennema, 1974). Females tend to achieve higher grades beginning in the primary years, whereas, males tend to do better on novel tasks (Kimball, 1989). This gender similarity begins to diverge around grade seven when females' mathematical achievement begins to decline (Jones 1984; Friedman 1989; Kimball, 1989). In high school, differences in mathematical achievement have consistently favored males (Hedges & Nowell, 1995; Hyde, Fennema, & Lamon, 1990). Even when looking at mathematically-gifted youth (Benbow, 1988), there are striking gender differences that are evident at the upper ranges. In one study looking at national samples of eighth graders to young adults, a higher variance was found in males compared to females on most cognitive test scores; males were consistently overrepresented in the upper extremes in mathematics (Hedges & Nowell, 1995). Males' advantage in mathematical ability may partly be explained by their superior visual-spatial abilities because these abilities are necessary when solving mathematical problems (Halpren & LaMay, 2003). There have been significant correlations found between spatial visualization and mathematics achievement as well as an improvement of spatial-test performance through geometric skills training (Fennema & Sherman, 1977). Research has also shown that males are more likely to use spatial strategies even when dealing with verbal word problems (McGuinness, 1993), however, the age at which males begin exhibiting higher spatial reasoning is not yet known. Kerns and Berenbaum (1991) found spatial ability differences in males and females between 9 to 13 years, whereas others researchers (Maccoby & Jacklin, 1974; Waber, 1976) have found these differences emerging after puberty.

A study was conducted by Casey, Nuttall, Pezaris, and Benbow (1995) to understand the relationship between quantitative skills and visual-spatial ability, but the results showed no gender differences in mathematical performance of individuals who were of approximately average ability. There were, however, gender differences found among gifted individuals, which could partly be due to their excellent visual-spatial skills. Much less is known about the gender differences among younger mathematically-gifted children. A study conducted by Mills, Ablard & Strump (1993), examined a sample of academically-gifted children from grades two to six and found that males tended to have higher mathematical achievement at an earlier age compared to females, except on the tasks that required judgment. Another study conducted by Stanley (1994) reported similar differences for fifth- and sixth-graders.

Research looking at gender differences in mathematical achievement has also focused on other themes besides innate differences between males' and females' mathematical abilities. Most of the research has focused on various facets of sex-role socialization, including the lack of appropriate female role models for young girls to emulate (Parsons, Adler, & Kaczala, 1982); parental expectations that males will achieve higher than females in mathematics despite having an equal school performance (Entwisle & Baker, 1983); parents purchasing more toys and games that encourage mathematical skills for their sons than for their daughters (Hilton & Berglund, 1974); teachers encouraging males in math performance more than females (Fox, Brody, & Brody, 1980); females' own personal perception that mathematics is a "male" domain in which they do not excel because it conflicts with their sex-role identity (Fennema & Sherman, 1977); and females' own personal view of math as less useful to them than it is to males (Fox, Brody, & Tobin, 1980).

Verbal ability

In general, it is widely accepted that females tend to perform better than males on tasks that require verbal ability (Maccoby & Jacklin, 1974; Hyde & Linn 1988; Halpern, 1992; Strumpf, 1995; Halpern, 1996). It has been shown that females tend to "have a better understanding of complex logical relations expressed verbally and greater verbal creativity than males" (Droege, 1967). As previously stated, females have been shown to excel on tasks that require language usage, including spelling (Stanley, Benbow, Brody, Dauber, & Lupkowski, 1992), reading comprehension (Hedges & Newell, 1995) and writing (U.S. Department of Education, 1997). Many studies report that females have a greater facility in early reading skills and hold this advantage through adulthood (Downing, 1977; Droege, 1967). Finucci and Childs (1981) found that adult women tend to be better oral readers, buy more books, and read more for pleasure compared to men (Vogel, 2001). Females' advantage in early language development and reading facility is believed to contribute to their superior spelling ability (Droege, 1967; Finucci & Childs, 1981; McGuinness, 1985) and better punctuation skills (Droege, 1967; Maccoby & Jacklin, 1974). There has, however, been little research comparing males' and females' functioning in specific academic areas that require verbal ability, such as English and the social sciences. Research has mainly focused on males' and females' verbal abilities assessed through cognitive functioning measures.

Overall, when looking at all the main gender differences in academic functioning, the differences between males' and females' verbal ability and mathematics skills is small, while the gender differences in spatial ability tends to be moderate to large (Hedges & Nowell, 1998).

Academic achievement in individuals who present with a learning disability

When looking at gender differences in academic achievement of individuals who present with a learning disability, it has generally been found that males and females tend to be impaired in all aspects of semantic-syntactic processing, comprehension and production morphology (Denckla & Rudel, 1976; Donahue, 1984; Donahue, Pearl, & Brian, 1982; Vogel, 1975, 1977, 1983; Wigg & Semel, 1976, 1984), vocabulary development (Fry, Johnson, & Muehl, 1970; Wigg & Semel, 1976, 1984), lexical retrieval (Denckla & Rudel, 1976; Wolf, 1981) and recognition of melody pattern (Vogel, 1975; Vogel & Mc Grady, 1975). There is, however, little known about gender differences among individuals with a learning disability in these specific areas of language functioning (Vogel, 2001). Research has found that females with a learning disability tend to have more severe deficits compared to males with a learning disability. The research findings regarding reading ability have been varied based on the skill and the way it was measured. Females with a learning disability have been found to perform as well as males with a learning disability in reading of a single word orally (Eno & Woehlke, 1980; Ryckman, 1981). The research findings regarding written language ability and reading comprehension skills have also been inconsistent. Some findings reported female superiority in written language and reading comprehension and others found no significant gender differences (Vogel, 2001). Overall, these results parallel the pattern of normal achieving individuals. Eno and Woehlke (1980) found that females between the ages of 8 and 16 with a learning disability were significantly better spellers than males, as measured by the spelling subtest of the revised Wide Range Achievement Test (WRAT) (Jastak & Jastak, 1978). Superior writing ability, writing mechanics, and spelling in females with a learning disability was also reported by Younes, Rossner and Wedd (1983).

While there have also been inconsistent findings when looking at mathematical ability, it has mostly been found that males with a learning disability have superior mathematical reasoning ability compared to their female counterparts (Ackerman, Dykman, & Oglesby, 1983). "In general, it appears that system-identified females with learning disabilities are similar to their (normal achieving) female peers. They are inferior in math reasoning; however, they do not experience a problem-free, prepubescent period of adequacy in math computation" (Vogel, 2001, p. 47).

Other areas of research on gender differences in academic achievement

Most of the recent literature on gender differences in academic achievement has shifted its focus to looking at personal perceptions, motivation and intrinsic factors, as opposed to innate differences in males' and females' abilities. The research has been moving towards exploring the reasons why there are gender differences in academic performance. One such perspective, named the skill-development approach, maintains that an individual's self-concept is primarily the result of past achievement as opposed to a cause for subsequent achievement (Helmke & van Aken, 1995). The self-enhancement model, on the other hand, claims that academic achievement depends on prior achievement as well as on an individual's prior self-concept (Calsyn & Kenny, 1977). Another perspective, named the self-worth theory (Convington, 1984) states that individuals with low success expectations are more likely to develop failure-avoiding tactics, such as avoidance behaviour and procrastination. In general, the research supports the skill-development model. This model indicates that during childhood, an individual's self-concept is mainly a consequence of cumulative achievement-related successes and failures and does not have a significant impact on later achievement (Helmke & van Aken, 1995). Many of the areas that have been looked at include causal attributions (Helmke & van Aken), parental expectations and appraisals (based on gender stereotypes) (Bhanot & Jovanovic, 2005), parenting styles, adolescents' attributions (Glasgow, Dornbusch, Troyer, Steinberg, & Ritter, 1997), motivation and help-seeking behaviours (Gernigon, d'Arripe-Longueville, Debove, & Puvis, 2003) and internalizing and externalizing symptoms (Masten & Roisman, 2005).

Visual Motor Integration

Visual motor integration is a subgroup of visual spatial abilities and involves the ability to integrate visual and motor abilities (eye-hand coordination); it is defined as "the degree to which visual (information) perception and limb movements, in this case finger–hand actions, are well coordinated" (Gabbard, Gonclaves, & Santos, 2001, p. 201). The assessment of visual-motor integration involves finding out the extent to which an individual can integrate their visual and motor abilities. A review by Becker, Grunwald and Brazy (1999) supports the belief that motor development plays an integral role in cognitive development. This research purports that "early motor dysfunction may contribute to an array of developmental impairments evident by school age in the form of problems with attention, language, behavioral control, and social competence" (Gabbard, Gonclaves, & Santos, 2001, p. 200).

Visual-motor integration involves copying complex figures and requires perception and creative motor ability. To develop visual-motor ability, individuals have to first develop visual-perception recognition, then cognitive perception and finally creative motor expression. As individuals age, the ability to copy a figure improves, mainly because of the cognitive changes that are occurring (Ninio & Liebich, 1976). Visual-motor ability develops gradually in both sexes. Generally, before the age of seven, children have difficulties distinguishing and perceiving all the parts of the complex figure (Ginzburg & Opper, 1979; Waber & Homes 1986) and will typically copy this type of figure in a fragmentary way. However, between the ages of 7 and 12 there are changes in the perception and recognition of complex figures. At this age, children develop the ability to see that a figure is composed of separate individual parts and will first copy the basic rectangular shape (Waber, 1979;Waber & Homes, 1985, 1986).

One of the consistent findings in the literature is that females tend to have better finger dexterity, as well as better speed and accuracy of finger tapping, coding, copying geometric designs, writing, and typing (Broverman, Klaiber, Kobayashi, & Vogel, 1968; Denno, 1982; Keogh & Smith, 1968; Koppitz, 1975). Some research attributed these differences to verbal mediation (Majeres, 1977; Lawson & Inglis, 1984) and other research has confirmed female superiority on tests of visual-motor integration, such as the Developmental Test of Visual-Motor Integration – Fourth Edition – Revised (Beery & Beery, 2004) and the coding subtest of the WISC (Wechsler Intelligence Scale for Children) (Vogel, 2001). Research has also demonstrated this female superiority in coding speed and copying designs from four years of age through to adulthood (Keogh & Smith, 1968; Koppitz, 1975; Maccoby & Jacklin, 1974).

Visual-motor integration among individuals who present with a learning disability

When looking at children who present with a learning disability, research has shown that females tend to score similarly to their normal-achieving peers on the Coding and Digit Symbol subtests of the Wechsler tests (Denno, 1982; Levine & Fuller, 1972; Ryckman, 1981; Vance, Singer, & Engin, 1980; Vogel & Walsh, 1987). In fact, it was shown that of all the Performance subtests, females were more superior on the Coding subscale than their male counterparts. "It is hypothesized that this subtest demands a variety of prerequisite and simultaneous processing abilities at which females excel, including fine motor skills, finger dexterity, eye-hand coordination, visual-motor abilities, verbal abilities, attention span, and concentration" (Vogel, 2001, p. 46).

Emotional and behavioural functioning

The issue of gender differences in emotional and behavioural functioning is a controversial issue that has many influential implications for society. One of these implications includes access to mental health services. It has been shown that during childhood, males are more likely than females to receive mental health services, despite both genders having an equal prevalence of childhood psychological disorders (Achenbach & Edelbrock, 1981; Achenbach, Howell, Quay, & Conners, 1991). The reason for this discrepancy is unclear, although it may be due to factors directly related to gender, such as biased beliefs and stereotypes, or to factors indirectly associated with gender, such as externalizing and internalizing behaviours (Green & Clopton, 1996). Emotional and behavioural problems are generally dichotomized into two empirically- established groups that either reflect internalizing types of problems, including anxiety, depression, withdrawal, stress and eating disorders, or externalizing types of problems, including aggression, oppositional behaviours, school problems and delinquency) (Achenbach, 1991). Females tend to experience more internalizing types of emotions, such as shame, guilt, hurt, fear, and anxiety and more internalizing defenses, such as turning against oneself (Brooks-Gunn & Peterson, 1991; Broberg, Ekeroth, Gustafsson, Hansson, Hägglöf, Ivarsson, & Larsson, 2001). Males, on the other hand, tend to experience more externalizing emotions, such as contempt and more externalizing defenses, such as turning against others (Broberg et al., 2001). Several theorists have suggested that the internalizing problems, such as depression, anxiety disorders, or low self-esteem are mainly due to an inability to regulate internalizing emotions, such as shame, whereas the externalizing disorders, such as aggression, are mostly due to an inability to regulate externalizing emotions, such as anger (Leadbeater, Kuperminc, Blatt, Hertzog, 1999).

Research has shown that individuals who exhibit more externalizing behaviours, such as aggression or hyperactivity, are more likely to receive professional services compared to someone who is experiencing internalized problems, such as anxiety or depression (Lambert, Weisz, & Knight, 1989; Pearcy, Clopton, & Pope, 1993; Tarnowski, Anderson, Drabman, & Kelly, 1990). Therefore, this gender discrepancy in access to mental health services may, in part, be due to the different types of emotional and behavioural difficulties males and females experience. As males tend to exhibit more externalizing behaviours and females more internalizing emotions, it is more likely for males to receive professional assistance (Achenbach, Howell, Quay, & Conners, 1991). As well, research has shown that teachers tend to pay more attention to the males in the classroom and respond more readily when they misbehave, even when females are exhibiting identical behaviours (Jones, 1989; Lindley & Keithley, 1991). There appears to be more concern with externalizing behaviours in our society because they are more disruptive and difficult to manage. The distress of internalizing problems is usually underestimated and goes unnoticed because it is not overtly disruptive (Achenbach, Howell, Quay, & Connors, 1991; Hutton, 1984; Walker, Bettes, & Ceci, 1984).

In reviewing the literature, gender differences between males and females in emotional and behavioural functioning have been mainly attributed to either stressors or protective factors in one's life, as opposed to innate differences between males and females. Generally, the research tends to emphasize the complex interaction of antecedent conditions, an individual's level of personal adjustment or vulnerability, as well as the role of risk and protective factors in developing emotional and/or behavioural difficulties (Block & Gjerde, 1990; Rutter, 1990). A variety of developmental pathways can lead to the same disorders (equifinality) and particular risk factors may not lead to the same outcomes for every individual (multifinality) (Cicchetti & Rogosch, 1996). Most of the research on gender differences in emotional and behavioural functioning has begun to explore many of the risk factors for the development of externalizing and internalizing problems including stress, interpersonal relationships, self-concept, interpersonal and self-critical vulnerabilities, family factors, socio-economic status, and major life events (divorce, abuse) (for reviews, see Leadbeater, Kuperminc, Blatt, & Hertzog, 1999). Protective factors have also been addressed in the literature including individual coping strategies, family factors, and community-based factors (for reviews, see Leadbeater, Kuperminc, Blatt, & Hertzog). Despite these contributing factors, gender differences in emotional and behavioural functioning still remain. The following is an overview of the literature on the main areas of emotional and behavioural functioning where males and females differ.

Externalizing problems

As stated previously, emotional and behavioural problems are generally dichotomized into two empirically established groups that either reflect internalizing types of problems (including anxiety, depression, withdrawal, stress and eating disorders) or externalizing types of problems (including aggression, oppositional behaviours, school problems and delinquency) (Achenbach, 1991). The following is a brief overview of the main gender differences found in the literature in the areas of aggression, delinquency and hyperactivity.

Aggression. Research has shown that relational aggression is more common in females, whereas physical aggression is more typical of males (Crick, 1996; Crick & Grotpeter, 1995; McNeilly-Choque, Hart, Robinson, Nelson, & Olsen, 1996; Ostrov & Keating, 2004). Physical aggression includes behaviour that is aimed at harming or injuring another individual (Coie & Dodge, 1998) as well as physical damage or the threat of physical damage. (Crick, Ostrov, & Werner, 2006). Relational aggression, on the other hand, includes behaviors that are damaging to relationships and vehicles of harm (Crick & Grotpeter, 1995). This includes "direct and indirect acts such as threatening to end a friendship unless a peer complies with a request, using social exclusion as a retaliatory behavior, and spreading false rumors to encourage peers to reject a classmate" (Crick, Ostrov, & Werner, 2006, p. 131-132).

Research has also found that males and females describe their own personal experiences of aggression with different terminology (Campbell & Muncer, 1987). In general, males tend to view their aggression as a socially useful source of control over others and express less guilt over it, whereas females tend to view their aggression as a loss of self-control; they believe that showing aggression is wrong and feel guilty about expressing it (Alexander, Allen, Brooks, Cole, & Campbell, 2004). The majority of research on aggression has only focused on forms of aggression that are salient to males, while neglecting forms that are salient to females (Crick, Werner, Casas, O'Brien, Nelson, & Grotpeter, 1999). Gender differences in physical aggression have been found to be present early in childhood and remain relatively stable through adolescence and adulthood (Carlo, 1999). Longitudinal research and meta-analytic reviews have demonstrated that males tend to engage in more physical aggression compared to females at all ages (R. B. Cairns, B. D. Cairns, Neckerman, Ferguson, & Gariepy, 1989; Eagly, 1987; Eagly & Steffen, 1986; Hyde, 1984).

Delinquent behaviour. Similar to aggression, research has shown that there are large gender differences in delinquent behaviours that are generally not evident until four years of age (Keenan & Shaw, 1997). After the age of four, reports of behaviour problems in females tend to decrease during the elementary school years and reports of problem behaviours in males increase. In adolescence, however, females' rate of delinquent behaviour tends to increase and it is during this period of time that serious antisocial behaviour in adolescent females shows a dramatic increase over the juvenile rates (Aalsma & Lapsley, 2001). In a large epidemiological study (Offord, Adler, & Boyle, 1986; Offord, Boyle, & Racine, 1991) the rate of conduct disorder among 4 to 11 year-olds was reported to be 6.5% for males and 1.8% for females. Between the ages of 12 and 16 years, however, the increase in rates of conduct disorder in females increased (to 4.1%) at a higher rate in comparison with males (to 10.4%). As well, other research has shown that females tend to have a later average age of onset in delinquent behaviour, averaging 14 years of age (Warren & Rosenbaum, 1986). Overall, even though females tend to show the greatest increase in delinquent behaviour, males tend to exhibit more delinquent behaviours overall.

Hyperactivity. Affecting mostly males, Attention-Deficit-Hyperactivity Disorder (ADHD) is one of the most common and disruptive behaviour disorders of childhood. The prevalence rates for this disorder vary from 2–14% of school-aged children (Gaub & Carlson, 1997; Jensen, Watanabe, Richters, Cortes, Roper, & Liu, 1995; Nolan, Volpe, Gadow, & Sprafkin, 1999). Children with ADHD experience difficulties in their ability to sustain attention in tasks or play activities, to wait their turn, as well as to sit still and learn at school (Diamantopoulou, Henricsson, & Rydell, 2005). ADHD consists of three subtypes: inattentive, hyperactive/impulsive and combined (Levy, David, Bennett, & Michael, 2005). A study conducted by Graetz, Sawyer, Hazell, Arney and Baghurst (2001) found a prevalence of 7.5% for ADHD in a representative population, with the inattentive subtype being more common than the combined and hyperactive/impulsive subtypes. ADHD was found to be more prevalent among males for all three of these subtypes, with the male-female ratios for the combined type being approximately twice that of the hyperactive/impulsive and inattentive subtypes. The male to female ratio for the hyperactive/impulsive (1.7:1) subtypes was found to be lower compared to the ratio for the combined (4.6:1) subtypes.

A meta-analysis conducted by Gaub and Carlson (1997) found that females with ADHD tended to display lower levels of inattention, negative internalizing behavior and peer aggression compared to their male counterparts. Research has also shown that females with ADHD anticipate more negative peer responses (Thurber, Heller, & Hinshaw, 2002) and tend to display poor friendship stability and higher levels of conflict and relational aggression (Blachman & Hinshaw, 2002). As well, females with ADHD receive higher peer dislike scores compared to their male counterparts (Carlson, Tamm, & Gaub, 1997). Furthermore, research has shown that females with ADHD experience higher rates of major depression, anxiety disorders, and conduct disorder, and more evidence of school failure and cognitive impairment (Biederman, Faraone, Spencer, Wilens, Mick, & Lapey, 1994). The results of a meta-analytic study conducted by Gershon (2002, a, b) indicated that females manifested fewer externalizing problems but significantly more internalizing problems compared to their male counterparts. Research has also found that teachers tend to rate females with ADHD as less inattentive and having fewer externalizing problems than males with ADHD. Overall, the male to female ratio for ADHD has been estimated at 3:1; for clinical samples this ratio is closer to 9:1 (Graetz, Sawyer, Hazell, Arney, & Baghurst, 2001).

Internalizing Problems

As stated previously, emotional and behavioural problems are generally dichotomized into two empirically established groups that either reflect internalizing types of problems (including anxiety, depression, withdrawal, stress and eating disorders) or externalizing types of problems (including aggression, oppositional behaviours, school problems and delinquency) (Achenbach, 1991). The following is a brief overview of the main gender differences found in the literature in the area of anxiety, depression and withdrawal.

Anxiety. There are two general types of anxiety: trait and state (Miller & Bichsel, 2003). Trait anxiety is characterized by a tendency to feel anxious across all types of situations, while state anxiety is characterized by the experience of anxiety only in specific personally stressful or fearful situations (Sorg & Whitney, 1992). Research has found that females, from a clinical population, reported significantly greater concern regarding the cognitive and somatic experience of anxiety compared to males (Hewitt & Norton, 1993). Furthermore, another study conducted by Stewart, Taylor and Baker (1997) found that female undergraduate university students reported a significantly higher rate of anxiety and were more fearful of the physical symptoms of anxiety than their male counterparts. In general, research has shown that both state and trait anxiety affect task performance (Leon & Revelle, 1985; MacLeod & Donnellan, 1993; Sorg & Whitney, 1992). In general, individuals with high trait anxiety show poorer performance on various tasks compared to low trait anxiety individuals.

Depression. Historically and across cultures, it has been demonstrated that females are approximately twice as likely as men to experience depression (Nolen-Hoeksema, 1990; Wolk & Weissman, 1995; Bebbington, 1996; Sprock & Yoder, 1997). Research consistently indicates that both diagnostic syndromes and depressive symptoms are similar among boys and girls during childhood, with boys experiencing a slightly higher rate of depressive symptoms (Brooks- Gunn & Petersen, 1991; Nolen-Hoeksema & Girgus, 1994). In adolescence, however, the rates of depressive symptomatology increase for females while the rates for males stabilize until a 2:1 ratio is established (Nolen-Hoeksema & Girgus, 1994; Hankin & Abramson, 1999). In general, research has shown that females tend to report significantly higher rates of depressive symptoms than males beginning in adolescence and persisting into adulthood (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993; Nolen- Hoeksema & Girgus, 1994; Petersen, Compas, Brooks-Gunn, Stemmler, Ey, & Grant, 1993). It is thought that because females possess more preexisting risk factors than males, they are more likely to become depressed in the face of the increased stressors that accompany adolescence. These risk factors include a negative attributional style, poor body image and identification with a stereotypically feminine gender role (Nolen-Hoeksema & Girgus, 1994).

In general, studies have found that females are at least twice as likely as men to suffer from depression and anxiety disorders, including unipolar depression, dysthymia, panic disorder, post-traumatic stress disorder, generalized anxiety disorder, social anxiety disorder and phobias (Kessler, McGongale, Zhao, Nelson, Huges, Eshleman, et al., 1994). Research has shown that when anxiety is not co-morbid with depression, the gender ratio is approximately 1:1 (Ochoa, Becker, & Steer, 1992). The same results were found when depression was not co-morbid with an anxiety disorder, however, when both depression and anxiety co-occurred, the ratio jumped to 2:1. It is speculated that the gender difference in depression rates is actually a difference in the rates of co-morbid depression and anxiety (Ochoa, Becker, & Steer). As a result, it is not known whether females are more likely than males to experience pure depression and anxiety or only co-morbid depression and anxiety.

Withdrawal. There are two types of social withdrawal that are considered to reflect different combinations of underlying motivations (Thijs, Koomen, de Jong, van der Leij, & van Leeuwen, 2004). One type is when unsociable individuals isolate themselves because they are not motivated to seek contact with others, but prefer to be solitary (Asendorpf, 1990; Rubin & Burgess, 2001). The second type of withdrawal is when shy or socially anxious individuals are motivated to engage in contact with others but also want to avoid it at the same time (Rubin & Burgess, 2001). Although no gender differences have been reported for children's play behaviors associated with social anxiety and unsociability (Coplan, Gavinski, Lagace, Seguin, & Wichmann, 2001; Coplan, Prakash, O'Neil, & Armer. 2004; Coplan & Rubin, 1998), social withdrawal, and especially its socially anxious subtype, may be more characteristic for females than males. Research has suggested that shy and withdrawn behaviors may be more accepted in females than in males (Bowen, Vitaro, Kerr, & Pelletier, 1995; Keenan & Shaw, 1997) because it is more consistent with gender stereotypes. Other research has shown that in toddlerhood, females tend to be more socially inhibited

(Kochanska, 1991), and in grades one to four they are typically rated as more shy than their males counterparts (Volling, MacKinnon Lewis, Rabiner, & Baradaran, 1993).

Summary and Implications

The issue of gender differences is a controversial topic within our society with serious consequences that affect all avenues of our daily lives. Many theories, including biological, psychological, social psychological and gender-based theories, have attempted to explain why gender differences exist, whereas most of the research in the field has found minimal gender differences in most areas of functioning. Despite these consistent findings, our existing beliefs and stereotypes remain about the magnitude of gender differences; this has serious ramifications for our society and for our gender identity development. Our society, lifestyle and even our language is based on these beliefs and stereotypes, which help us make sense of the world and understand how we are supposed to behave. These beliefs and stereotypes also place consistent pressure on us to fit ourselves into the category of either male or female as well as to act in ways that are consistent with these gender stereotypes. If an individual does not fit into one of these two gender categories, our society does not know how to make sense of the individual, which typically results in them being ostracized and rejected; therefore, it is important to conduct research on gender differences in order to discover, and hopefully eliminate, the need for the dichotomization of gender.

This research study will add to the growing body of literature on gender differences in cognitive, academic, visual-motor, and emotional and behavioural functioning in both children and adults. This study will build on previous research by looking at multiple variables within each area of functioning that have not yet been addressed. Additionally, this research study may add validity to the gender-similarities hypothesis (Hyde, 2005), which holds that males and females are more alike than different. Hyde looked at 46 meta-analyses on gender differences and found an extensive amount of literature that supported the gender-similarities hypothesis. There were, however, a few notable exceptions, including some motor behaviors (e.g., throwing distance) and some aspects of sexuality, which show large gender differences (Hyde). As well, it was found that aggression showed a moderate gender difference; therefore, this study may add to the evidence that supports this modern perspective and also provide evidence that there are few innate gender differences.

Hypotheses

The purpose of this research study is to assess gender differences among children and adults in cognitive, academic, visual-motor, and emotional and behavioural functioning in a clinic-referred population. It is hoped that the results of this study will make a significant contribution to the current literature in the field. The following hypotheses have been generated based on previous literature.

Hypothesis 1

There will be no significant differences between males and female in the area of cognitive functioning.

Hypothesis 2

There will be no significant differences between males and females in the area of academic functioning.

Hypothesis 3

There will be no significant differences between males and females in the area of visual-motor functioning.

Hypothesis 4

There will be significant differences between males and females in the area of emotional and behavioural functioning. Males will scores higher on the externalizing behaviour scales, whereas females will score higher on the internalizing behaviour scales.

Hypothesis 5

In the areas of functioning where significant gender differences are found, females will be lower-functioning compared to males.

CHAPTER 3: METHODOLOGY

Overview

This study was based on a retrospective case design, in which archival data of 401 participants was collected and analyzed. These individuals were administered an assessment battery that consisted of a selection of the following measures as part of a comprehensive psycho-educational assessment administered at the Education Clinic at the University of Alberta: *Stanford-Binet Intelligence Scales – Fifth Edition (SBV), Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV), Wechsler Adult Intelligence Scale – Third Edition (WAIS-III), Wechsler Individual Achievement Test – Second Edition (WIAT-II), Woodcock-Johnson – Third Edition (WJ-III), Wide Range Achievement Test – Third Edition (WRAT-3), Beery-Buktenica Developmental Test of Visual-Motor Integration – Fourth Edition – Revised (Beery VMI), Bender Visual-Motor Gestalt Test – Second Edition (Bender-Gestalt II), Beck's Anxiety Inventory (BAI), Beck's Depression Inventory – Second Edition (BDI-II), Behavior Assessment System for Children (BASC)* and the *Behavior Assessment System for Children – 2nd Edition (BASC-2).* The data was analyzed and compared using univariate statistical analysis and descriptive statistics.

Participants

Participant Selection

The participants were selected from a sample of 895 individuals referred to a university-based psychological counselling and assessment clinic, between the years of 2004 and 2006, for a variety of behavioural, emotional, cognitive, and/or academic concerns. This sample consisted of 103 female children, 193 male children, 53 female adults and 52 male adults. The female children ranged in age from 4 to 17 years (M = 10.55, SD = 2.897) and the male children ranged in age from 3 to 17 years (M = 10.36, SD = 3.125). The female adults ranged in age from 16 to 61 years (M = 30.94, SD = 12.323) and the male adults ranged in age from 16 to 51 years (M = 27.04, SD = 9.899).

Table 1

Descriptive Statistics of the Child and Adult Samples

	Number of Participants	Age Range	Mean & Standard Deviation
Female			
• Child	• 103	• 4-17 years	M = 10.55 SD = 2.897
• Adult	• 53	• 6-61 years	M = 30.94 SD = 12.323
Male			
• Child	• 193	• 3-17 years	M = 10.36 SD = 3.125
• Adult	• 52	• 16-51 years	M = 27.04 SD = 9.899

Participants were selected for this study if they were between the ages of 2 and 89 and had completed a psychological assessment at the University of Alberta Education Clinic. Each of these individuals were administered an assessment battery typically consisting of a cognitive, academic, visual-motor, and emotional and behavioral functioning measures. In general, this population is similar to other clinic-referred populations.

Measures

A brief description of the measures and their component subtests included in the study will be discussed in this section.

Stanford-Binet Intelligence Scales – Fifth Edition

The Stanford-Binet Intelligence Scales – Fifth Edition (SBV) is an individually administered assessment of intelligence and cognitive functioning for individuals ages 2 through 85. The SBV measures individuals' general level of intellectual functioning, in addition to their verbal and nonverbal based abilities. As well, this test measures five different factors of cognitive functioning: Fluid Reasoning (FR), Knowledge (KN), Quantitative Reasoning (QR), Visual-Spatial Processing (VS), and Working Memory (WM). The Fluid Reasoning factor measures an individual's ability to solve verbal and nonverbal problems using inductive and deductive reasoning. Inductive reasoning requires an individual to reason from the part to the whole, from the specific to the general, or from the individual instance to the universal principle. Deductive reasoning, on the other hand, requires an individual to infer a conclusion, implications or specific example. This factor also measures an individual's ability to determine underlying rules or relationships among pieces of information (such as visual objects) that are novel to the individual. The Knowledge factor measures an individual's accumulated fund of general information at home, at school, and in the community. This factor involves learned material, such as vocabulary, that has been acquired and stored in long-term memory. The Quantitative Reasoning factor measures an individual's facility with numbers and numerical problem solving, whether it is with word problems or pictured relationships. The Visual-Spatial Processing factor measures an individual's ability to see patterns, relationships, spatial orientation or the whole among diverse pieces of a visual display and the Working Memory factor measures an individual's ability to inspect, sort and transform diverse information stored in short-term memory.

The SBV also measures an individual's Verbal and Performance based intellectual functioning. Verbal Intellectual functioning involves an individual's ability to think, reason, solve problems, visualize and recall important information presented in words and sentences (printed or spoken). This ability reflects an individual's capacity to explain verbal responses clearly, present rationale for response choices, create stories and explain spatial directions. General verbal ability is one of the most powerful predictors of academic success in western cultures because of the heavy reliance on reading and writing in formal school programs. Performance Intellectual functioning involves an individual's ability to solve abstract, picture-oriented problems, recall facts and figures, solve quantitative problems shown in picture form, assemble designs and recall tapping sequences. Additionally, this index reflects an individual's ability to reason, solve problems, visualize and recall information presented in pictorial, figural, and symbolic form, as opposed to information presented in the form of words and sentences. Performance skills also require a small degree of auditory skill to understand brief examiner-spoken directions.

Standardization sample

The norming sample consisted of 4,800 subjects between the ages of 2 and 85 (Roid, 2003). This sample was nationally representative of the population according to the U.S. Census Bureau (2001) (Roid) and matched to the percentages across five stratification variables. The stratification variables included age, sex, race/ethnicity, geographic region and socioeconomic level. Thirty age groups were used for stratification purposes and there were an equal number of males and females at each age level except with the elderly, which included more women than men, in proportions consistent with the census data. The categories of race/ethnicity included White or Anglo-American, Black or African American, American Indian and Alaskan Native, Asian, and Native Hawaiian or Other Pacific Islander. As well, four geographical regions (Northeast, Midwest, South and West) were used in stratifying the normative sample and educational attainment was used as an indicator of socioeconomic status.

Measures of reliability

Reliability of the SBV was assessed in terms of internal consistency, test-retest stability and interscorer agreement. The overall reliability of a test score "refers to its precision in measuring the true attributes of a person and its consistency across sets of items, multiple testing occasions, and other conditions that affect score stability" (Roid, 2003, p. 63).

Internal consistency, which is the extent to which test items measure the same characteristic (Gay & Airasian, 2003), was established using split-half method with Spearman-Brown analysis (Roid, 2003). The split-half reliability for the Full Scale

Intelligence Quotient (FSIQ) was excellent, ranging from .97 to .98 and the reliability co-efficients for Verbal Intelligence Quotient (VIQ) and Nonverbal Intelligence Quotient (NVIQ) ranged from .95 to .96. For the five Factor Indexes, the median split-half reliability was greater than .90. For the non-verbal and verbal subtests, the reliability coefficients were very good and ranged from .84 to .89.

To determine test-retest reliability, which is the stability of test scores over time, four samples of examinees were administered the SBV on two separate occasions (Roid, 2003). This sample included four different age groupings of 2 to 5, 6 to 20, 21 to 59 and over 60. For the Non-verbal and Verbal subtests (Fluid Reasoning, Knowledge, Quantitative Reasoning, Visual-Spatial Processing and Working Memory), the test-retest correlations ranged from .66 to .93 with medians of .82, .87, .79 and .86 for the different age groups respectively. The correlations for the NVIQ and the VIQ were strong and ranged from .89 to .95 with a median of .93. The stability coefficients for the FSIQ were also high and ranged from .93 to .95.

Interscorer agreement "is typically defined as the agreement between two or more examiners who score the responses of the same examinee" (Roid, 2003, p. 74) and was established by having two trained examiners rescore record 120 response forms and these rescored forms were then compared to the original examiner's item scores. The interscorer agreement correlations were high and ranged from .74 to .97 with a median of .90.

Measures of validity

The validity of the SBV was supported through content, criterion and construct-related evidence. Content validity is the extent to which a measure reflects the specific intended domain of content (Roid, 2003). This was established using empirical item analysis, professional judgment of researchers, assessment experts and examiners, as well as the consultation with experts on the Cattell-Horn-Carroll (CHC) theory of intellectual abilities (Roid, 2003).

Criterion validity was established by correlating the SBV with other valid measures of intellectual abilities (concurrent validity) as well as with valid achievements measures (predictive validity). Concurrent validity was established by comparing the SBV to other highly validated measures of intellectual ability, including the previous edition of the Stanford-Binet Intelligence Scale (SB-IV and Form L-M), the Wechsler Preschool and Primary Scale of Intelligence – Revised (WPPSI-R), the Wechsler Intelligence Scale for Children – Third Edition (WISC-III), the Wechsler Adult Intelligence Scale – Third Edition (WAIS-III), and the Woodcock-Johnson III of Cognitive Abilities (WJ III COG) (Roid, 2003). The concurrent validity for FSIQ ranged from .78 to .90, which indicates strong criterion-related evidence of validity and consistency. Predictive validity was established by comparing the SBV to other highly validated measures of academic abilities, including the Woodcock-Johnson III Tests of Achievement (WJ III ACH) and the Wechsler Individual Achievement Test – Second Edition (WIAT-II). The predicative validity of the FSIQ ranged from .60 to .84 on the WJ III ACH and .42 to .83 on the WIAT-II.

Construct validity is the collection of evidence that test scores truly measure their intended constructs (Cronbach & Meehl, 1955). This was established through intercorrelation and facto-analytic studies (Roid, 2003). As well, both exploratory and confirmatory factor-analytic analyses were conducted and the results supported that the subtests of similar functioning correlated more highly with each other than with subtests measuring different types of functioning.

Wechsler Intelligence Scale for Children – Fourth Edition

The Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV) is an individually administered test of cognitive functioning for individuals ages 6 through 16 (Roid, 2003). The WISC-IV assesses an individual's general level of intellectual functioning and four specific areas of cognitive functioning, including Verbal Comprehension, Perceptual Reasoning, Working Memory and Processing Speed. The Verbal Comprehension index measures an individual's ability to think, reason, evaluate, solve problems, visualize and recall important information presented in words and sentences (printed or spoken). This ability reflects an individual's capacity to explain verbal responses clearly and present rationale for response choices. The Perceptual Reasoning index measures an individual's ability to solve abstract, picture-oriented problems, recall facts and figures, and see patterns, relationships, spatial orientation or the whole among diverse pieces of a visual display. Additionally, this index reflects an individual's ability to reason, solve problems, visualize and recall information presented in pictorial, figural, and symbolic form, as opposed to information presented in the form of words and sentences. Perceptual Reasoning skills also require a small degree of auditory ability to understand brief examiner-spoken directions. The Working Memory index measures an individual's ability to temporarily store, structure, process and manipulate information. This ability is most useful when trying to understand a spoken sentence or remember a string of digits. The Processing Speed index measures the speed at which a person takes in, uses, stores, retrieves and expresses information.

Standardization sample

The norming sample consisted of 2,200 individuals between the ages of 16 and 89 (Wechsler, 2003). This sample was nationally representative of the population according to the 1995 U.S. Census and matched the percentages across each demographic variable (Wechsler). The demographic variables included age, sex, race/ethnicity, education level and geographic region. Thirteen age groups were used for stratification purposes and there were an equal number of male and female participants in each age group from 16 to 64 except in the older age groups, which included more women than men, in proportions consistent with the census data. For each age group, there was a representative proportion of the racial/ethnicity groups, including White or Anglo-American, Black or African American, Hispanics, and other racial/ethnic groups, which was also based on the 1995 U.S. Census (Wechsler). The norming sample was also stratified according to five parent education levels, based on the number of years of schooling completed, and four main geographical regions (Northeast, North Central, South and West).

Measures of reliability

Reliability of the WISC-IV was assessed in terms of internal consistency, test-retest stability and interscorer agreement. Internal consistency was established using split-half method with the Spearman-Brown formula (Wechsler, 2003). The split-half reliability for the FIQ was excellent at .97 and the reliability coefficients for the composite scales (Verbal Comprehension, Perceptual Reasoning, Working Memory and Processing Speed) ranged from .88 to .94.

Test-retest stability was determined by administering the WISC-IV to 243 children, which were split into 11 age groups, on two separate occasions (Wechsler, 2003). The stability coefficient from the FSIQ was .93 and the stability coefficients of the composite scores were excellent and ranged from .86 to .93.

Interscorer agreement was established by having four raters independently score each of the protocols from the norming sample (Wechsler, 2003). The interscorer agreement correlations were high and ranged from .98 to .99.

Measures of validity

The validity of the WISC-IV was supported through content, criterion and construct-related evidence (Wechsler, 2003). Content validity for the WISC-IV was established through a comprehensive literature review, which ensured that the items and subtests adequately sampled the domains of intellectual functioning the test is intended to measure.

Criterion validity was established by correlating the WISC-IV with other valid measures of intellectual abilities (concurrent validity), as well as with valid achievements measures. Concurrent validity was established by comparing the WISC-IV to other highly valid measures of intellectual ability, including the previous edition of the Wechsler Intelligence Scale for Children – Third Edition (WISC-III), the Wechsler Preschool and Primary Scale of Intelligence – Revised (WPPSI-R) and the Wechsler Adult Intelligence Scale – Third Edition (WAIS-III) (Wechsler, 2003). Overall, the concurrent validity for FSIQ was strong with a median coefficient of .89

(Manual). Predictive validity was supported by comparing the WISC-IV to other highly valid measures of academic abilities, including the Woodcock-Johnson III Tests of Achievement (WJ III ACH) and the Wechsler Individual Achievement Test (WIAT-II). Overall, the predicative validity of the FSIQ ranged from .60 to .84 on the WJ III ACH and .42 to .83 on the WIAT-II.

Construct validity was established through intercorrelation and factor-analytic studies (Wechsler, 2003). As well, both exploratory and confirmatory factor-analytic analyses were conducted and the results supported that the subtests of similar functioning correlated more highly with each other than with subtests measuring different types of functioning.

Wechsler Adult Intelligence Scale – Third Edition

The Wechsler Adult Intelligence Scale – Third Edition (WAIS-III) is an individually administered test of cognitive functioning for individuals ages 16 through 89 (Wechsler, 2001). This test measures an individual's general level of intellectual functioning as well as Verbal and Performance based functioning. Additionally, the WISC-IV assesses four different areas of cognitive functioning, including Verbal Comprehension, Perceptual-Organization, Working Memory and Processing Speed. The Verbal Comprehension index measures verbal analogous reasoning and verbal concept formation. This includes an individual's fundamental knowledge base, expressive language and abstract reasoning skills and memory. The Perceptual-Organization index measures an individual's visual acuity, attention to detail, memory and concentration, visual-spatial reasoning ability and motor skills. The Working Memory index measures an individual's mathematical knowledge, concentration, working memory and auditory attention and the Processing Speed index measures an individual's language learning ability, scanning speed and perceptual discrimination.

Standardization sample

The norming sample consisted of 2,450 individuals between the ages of 16 and 89 (Wechsler, 2001). This sample was nationally representative of the population according to the 1995 U.S. Census (Wechsler) and matched the percentages across each stratification variable. The stratification variables included age, sex, race/ethnicity, education level and geographic region. Thirteen age groups were used for stratification purposes and there were an equal number of male and female participants in each age group except in the older age groups, which included more women than men, in proportions consistent with the census data. For each age group, there was a representative proportion of racial/ethnicity groups, including White or Anglo-American, Black or African American, Hispanics, and other racial/ethnic groups. The norming sample was also stratified according to five education levels, which were based on the number of years of schooling completed, and four main geographical regions (Northeast, North Central, South and West).

Measures of reliability

Reliability of the WAIS-III was assessed in terms of internal consistency, test-retest stability and interscorer agreement. The internal consistency was established using the odd-even split method and the Spearman-Brown formula (Wechsler, 2001). The split-half reliability coefficients for the FSIQ, VIQ and PIQ were excellent at .98, .97 and .94 respectively. The reliability coefficients for the composite scales (Verbal

Comprehension, Perceptual Reasoning, Working Memory and Processing Speed) were very good and ranged from 0.88 to .96.

Test-retest stability was determined by administering the WAIS-III to 394 individuals, split into 13 different age groups, on two separate occasions (Wechsler, 2001). The stability coefficients for the FSIQ were excellent and ranged from .95 to .97 across all age groups. Stability coefficients for VIQ and PIQ were also excellent and ranged from .94 to .97 and .88 to .92 respectively. For the composite scores, the stability coefficients ranged from .83 to .96.

The interscorer agreement was established by having three raters independently score 60 protocols (Wechsler, 2001). Overall, the interscorer agreement coefficients were high, averaging in the high .90s. For the three Verbal subtests, the coefficients were very high: .95 (Vocabulary), .93 (Similarities), and .91 (Comprehension).

Measures of validity

The validity of the WAIS-III was supported through content, criterion and construct-related evidence. Content validity for the WAIS-III was established through a comprehensive literature review to ensure the items and subtests adequately sampled the areas of intellectual functioning the test is intended to measure (Wechsler, 2001). Additionally, several consultants evaluated the test to identify items for possible deletion or retention.

Criterion validity was established by correlating the WAIS-III with other valid measures of intellectual ability (concurrent validity) and with valid achievements measures (predictive validity). Concurrent validity was established by comparing the

WAIS-III to other highly validated measures of intellectual ability, including the previous edition of the Wechsler Adult Intelligence Scale – Revised (WAIS-R), the Wechsler Intelligence Scale for Children – Third Edition (WISC-III) and the Stanford-Binet Intelligence Scales – Fourth Edition (SB-IV) (Wechsler, 2001). Overall, the concurrent validity for FSIQ was strong and ranged from .88 to .93. The coefficients for the VIQ ranged from .88 to .94 and the coefficients for the PIQ ranged from .78 to .86. Predictive validity was supported by comparing the WAIS-III to another highly valid measure of academic ability, the Wechsler Individual Achievement Test--Second Edition (WIAT-II). Overall, the predicative coefficients between the WAIS-III IQ and composite scores with the WIAT-II composite scores ranged from .53 to .82.

Construct validity was established for the WAIS-III through intercorrelation and factor-analytic studies (Wechsler, 2001). As well, both exploratory and confirmatory factor-analytic analyses were conducted and the results supported that the subtests of similar functioning correlated more highly with each other than with subtests measuring different types of functioning.

Wechsler Individual Achievement Test – Second Edition

The Wechsler Individual Achievement Test – Second Edition (WIAT-II) is a comprehensive, individually administered achievement measure for individuals between the ages of 4 and 85 (The Psychological Corporation, 2002). This measure contains four main composite areas (Reading, Mathematics, Written and Oral Language) and nine different subtests (Word Reading, Reading Comprehension, Pseudoword Decoding, Numerical Operations, Math Reasoning, Spelling, Written

Expression, Listening Comprehension and Oral Expression) (see Appendix A for a description of the WIAT-II scales).

Standardization sample

The norming sample consisted of 5,586 individuals between the ages of 2 and 85 (The Psychological Corporation, 2002). The standardization sample was nationally representative of the population according to the 2001 U.S. Census Bureau (The Psychological Corporation) and matched the percentages across each stratification variable. The stratification variables included age, sex, race/ethnicity, geographic region and socioeconomic level. Thirty age groups were used for stratification purposes and there were an equal number of male and females participants in each age group except in the older age groups, which included more women than men, in proportions consistent with the census data. For each age group, there was a representative proportion of racial/ethnicity groups, including white or Anglo-American, black or African-American, American-Indian and Alaskan-Native, Asian, and Native-Hawaiian or Other Pacific Islander. The norming sample was also stratified across four geographical regions (Northeast, Midwest, South and West) and educational attainment was used as an indicator of socioeconomic status.

Measures of reliability

Reliability of the WAIT-II was assessed in terms of internal consistency, test-retest stability and interscorer agreement. The internal consistency was established using spilt-half method with Spearman-Brown analysis (The Psychological Corporation, 2002). The split-half reliability coefficients for the subtests ranged from .80 to .97 and .89 to .98 for the composites.

Test-retest stability was determined by administering the WIAT-II to 297 individuals, spilt into 3 different age groups, on two separate occasions (The Psychological Corporation, 2002). The stability coefficients for the subtests ranged from .85 to .98 and .92 to .98 for the composite.

The interscorer agreement was established by having two raters independently score 2,180 examinees' responses (The Psychological Corporation, 2002). Overall, the interscorer agreement coefficients were high and ranged from .94 to .98, with an average coefficient of .94.

Measures of validity

The validity of the WIAT-II was supported through content, criterion and construct-related evidence. Content validity was established using expert judgments and by conducting an empirical item analysis (The Psychological Corporation, 2002).

Criterion validity was established by correlating the WAIT-II with other valid measures of academic ability (concurrent validity) and with valid intellectual measures (predictive validity). Concurrent validity was established by comparing the WAIT-II to other highly validated measures of academic ability, including the previous edition of the Wechsler Individual Achievement Test (WIAT), Wide Range Achievement Test – Third Edition (WRAT-3), the Differential Ability Scales (DAS) (The Psychological Corporation, 2002). Overall, the correlation coefficients among the scores on the reading-related, mathematics, and spelling subtests of the WIAT-II and those of the WIAT, WRAT-3 and DAS were highly consistent and ranged from .76 to .86.

Predictive validity was supported by comparing the WAIT-II to another highly valid measure of intellectual ability, including the Wechsler Adult Intelligence Scale –

Third Edition (WAIS-III), the Wechsler Intelligence Scale for Children – Third Edition (WISC-III) and the Wechsler Preschool and Primary Scale of Intelligence – Revised (WPPSI-R) (The Psychological Corporation, 2002). Overall, most of the coefficients were between .30 and .78 for the FSIQ scores.

Construct validity was established for the WIAT-II through intercorrelation and factor-analytic studies (The Psychological Corporation, 2002). As well, both exploratory and confirmatory factor-analytic analyses were conducted and the results supported that the subtests of similar functioning correlated more highly with each other than with subtests measuring different types of functioning.

Woodcock-Johnson – Third Edition

The Woodcock-Johnson – Third Edition (WJ III) is a comprehensive, individually administered achievement test for individuals between the ages of 2 and 90 (McGrew & Woodcock, 2001). This measure contains 22 subtests measuring five curricular areas (reading, mathematics, written language, oral language and academic knowledge) and two auxiliary writing evaluation procedures. The standard battery contains 12 tests, including Letter-Word Identification, Reading Fluency, Story Recall, Understanding Directions, Calculation, Math Fluency, Spelling, Writing Fluency, Passage Comprehension, Applied Problems, Writing Samples, Story-Recall-Delayed (see Appendix B for a description of the WJ III scales).

Standardization sample

The norming sample consisted of 8,818 individuals between the ages of 2 and 90 (McGrew & Woodcock, 2001). This sample was nationally representative of the 2000 U.S. Census (McGrew & Woodcock, 2001) and based on 10 community and subject variables. These variables included census region, community size, sex, race, Hispanic, type of school (elementary, secondary), type of college/university, education of adults, occupational status of adults and occupations of adults in the labour force. There were an equal number of males and females and representative proportions from each racial group, including white or Anglo-American, black or African-American, Indian, Asian and Pacific-Islander, Hispanic and non-Hispanic. The sample was also stratified according to education level (Preschool, Kindergarten through Grade 12, College/University and Adult) and geographical location (Northeast, North Central, South and West).

Measures of reliability

Reliability for the WJ-III was assessed in terms of internal consistency, test-retest stability and interscorer agreement. The internal consistency was established using the odd-even split method and the Rasch analysis (McGrew & Woodcock, 2001). The split-half reliability coefficients for the subtests ranged from .81to .94.

Test-retest stability was assessed by administering eight of the WJ-III subtests (Visual Matching, Decision Speed, Retrieval Fluency, Rapid Picture Naming, Pair Cancellation, Reading Fluency, Math Fluency and Writing Fluency) in a counter balanced order to 165 randomly selected individuals that were spilt into three different age groups (7-11, 14-17 and 26-79) (McGrew & Woodcock, 2001). The stability coefficients for theses subtests ranged from .80 to .94, .73 to .89 and .69 to .96 for each respective age group.

The interscorer agreement was established across three different studies for the subtests that require subjective evaluation (Writing Samples, Writing Fluency and

Handwriting) (McGrew & Woodcock, 2001). Each of these studies had qualified raters independently scoring a random selection of protocols from three different age groups and the interrater coefficients were .90, .98 and .93 respectively.

Measures of validity

The validity of the WJ-III was supported through content, criterion and construct-related evidence. Content validity for the WJ-III was established by consulting with outside experts, including teachers and psychologists during item development (McGrew & Woodcock, 2001). This ensured that the test items and subtests adequately sampled the areas of academic functioning the test was intended to measure. Furthermore, sensitivity and bias reviews were conducted with the WJ-III as a part of item development.

Construct validity for the WJ-III was established through intercorrelation and factor-analytic studies, including both exploratory and confirmatory factor-analytic analysis (McGrew & Woodcock, 2001). The results supported that the measures of similar functioning correlated more highly with each other than with the measures that assessed different types of functioning.

Wide Range Achievement Test – Third Edition

The Wide Range Achievement Test – Third Edition (WRAT-3) measures the basic academic skills of word recognition, spelling from dictation and arithmetic computation (Wilkinson, 1993). The reading subtest measures how well an individual can recognize and name letters and pronounce words out of context. The ability to write one's name, write letters and words to dictation is measured by the spelling subtest and the arithmetic subtest measures an individual's ability to count, read number symbols, solve oral problems and perform written computations. There are two equivalent test forms that can be administered individually, either as a pre- and post-test or combined with a more comprehensive psycho-educational assessment.

Standardization sample

The norming sample consisted of 4,433 subjects between the ages of 5 and 75 (Wilkinson, 1993). This sample was nationally representative of the population according to the 1990 U.S. Census Bureau (Wilkinson) and matched the percentages across each stratification variable. The stratification variables included age, sex, race/ethnicity, geographic region and socioeconomic level. For the twenty-three age groups, there were an equal number of males and females and a representative proportion of racial/ethnicity groups, including white or Anglo-American, black or African-American, Hispanic and other. The norming sample was also stratified across four geographical regions (East, North Central, South and West) and parental occupation was used as an indicator of socioeconomic status.

Measures of reliability

Reliability of the WRAT-3 was assessed in terms of internal consistency and test-retest reliability. The median internal consistency coefficients were excellent and ranged from .92 to .95 (Wilkinson, 1993). For the reading scale, the coefficients ranged from .87 to .99, with a median of .92. The coefficients for the spelling scale ranged from .86 to .99, with a median of .93 and for the arithmetic scale, the coefficients ranged from .82 to .99, with a median of .89. The stability coefficients for the WRAT-3 were established using the test-retest method with 24 individuals from the norm group and ranged from .91 to .98.

Measures of validity

The validity of the WRAT-3 was supported through content, criterion and construct related evidence. Content validity was established by ensuring that all the items and subtests adequately sampled the areas of academic functioning the test is intended to measure (Wilkinson, 1993). Also, to ensure the test included easy, hard and in-between items, the Rasch statistic of item separation was conducted on a random selection of WRAT-3 items. The results of this analysis demonstrated strong content validity in each of the content areas, including reading, spelling and arithmetic.

Criterion validity was established by correlating the WRAT-3 with other valid measures of academic ability (concurrent validity) as well as with valid measures of intellectual ability. Concurrent validity was established by comparing the WRAT-3 to the previous edition of the Wide Range Achievement Test – Revised (WRAT-R) (Wilkinson, 1993). The correlation coefficients between the WRAT-R and the WRAT-3 scales ranged from .79 to .99. Predictive validity was established by correlating the WRAT-3 with valid measures of intellectual ability, including the Wechsler Intelligence Scale for Children – Third Edition (WISC-III) and the Wechsler Adult Intelligence Scales – Revised (WAIS-R). The WRAT-3 scales (reading, spelling and arithmetic) correlated .66, .66 and .73, respectively, with the WISC-III FSIQ scores. With the WAIS-R, the WRAT-3 scales correlated .53, .49 and .60, respectively, with the FSIQ scores.

Construct validity was established by correlating the WRAT-3 subtests. The intercorrelations for the Reading-Spelling comparison ranged from .81 to .91, with a median of .87 (Wilkinson, 1993). For the Reading-Arithmetic comparison, the intercorrelations ranged from .54 to .78, with a median of .66 and the intercorrelations for the Spelling-Arithmetic comparison ranged from .58 to .82, with a median of .70.

Beery-Buktenica Developmental Test of Visual-Motor Integration – Fourth Edition – Revised

The Beery-Buktenica Developmental Test of Visual-Motor Integration – Fourth Edition – Revised (Beery VMI) is a developmental sequence of 30 geometric forms to be copied with paper and pencil for individuals between the ages of 2 and 18 (Beery & Beery, 2004). The Beery VMI is designed to assess the extent individuals can integrate their visual and motor abilities (eye-hand coordination). There are also two more supplemental tests on the Beery VMI that measure Visual Perception and Motor Coordination. For the purpose of this study, data was only collected from the Visual Motor Index (VMI).

Standardization sample

The norming sample consisted of approximately 600 children between the ages of 2 and 15 (Beery & Beery, 2004). Initially, this sample was administered 72 geometric forms, which was downsized to develop a sequence of 30 forms. Subsequently, these 30 forms were administered to another 600 children and an item-analysis was conducted on the final form. The Beery VMI was originally normed in 1964 on 1,030 children in Illinois and has been most recently cross-validated on 2,614 children from five major sections of the United States; this measure has also been normed in other countries. Overall, the Beery VMI norms have been consistent and stable over time and place.

Measures of reliability

The reliability of the Beery VMI was assessed in terms of internal consistency, interscorer reliability and test-retest stability. The internal consistency of the Beery VMI was determined using the split-half method (Beery & Beery, 2004). Using this method, the test items were separated into two components using an odd-even split and then each half of the test was correlated. The reliability coefficient was .88, indicating that the Beery VMI provides consistent and stable measurements.

To establish interscorer reliability, two individuals independently scored 100 randomly selected Beery VMI tests from the norming sample (Beery & Beery, 2004). The median interrater reliability coefficient for the Beery VMI was .92.

Test-retest reliability was established by administering the Beery VMI to 115 children on two separate occasions (Beery & Beery, 2004). The overall test-retest raw score coefficients were .89.

Measures of validity

The validity of the Beery VMI was supported through criterion and construct related evidence. Criterion validity was established by correlating the Beery with other valid measures of visual motor ability (concurrent validity) as well as with other measures of academic ability (predictive ability). Concurrent validity was established by comparing the results of the Berry VMI to other tests that measure similar constructs, including the Copying subtest of the Developmental Test of Visual Perception (DTVP-2) and the Drawing subtest of the Wide Range Assessment of Visual Motor Abilities (WRAVMA) (Beery & Beery, 2004). The correlation coefficients were .52 and .75 respectively.

Predictive validity was established by correlating the Beery VMI with nonverbal intelligence tests and academic achievement results, including the Wechsler Intelligence Scale for Children – Revised and the Comprehensive Test of Basic Skills (CTBS) (Beery & Beery, 2004). For the PIQ on the WISC-R, the correlation coefficient was .66 and for the Comprehensive Test of Basic Skills (CTBS), the coefficients were .58 for reading, .68 for language and .42 for mathematics. In general, researchers have found the Beery to be a valuable predictor when used in combination with other measures. For example, in combination with a test of auditory-vocal association, the Beery VMI was able to identify high-risk boys in kindergarten who eventually had reading difficulties. As well, the Beery VMI and the Test for Auditory Comprehension of Language both significantly predicted Reading, Language Arts and Mathematics scores between entering Kindergarten and the end of first grade. Beery VMI scores, in addition to pediatricians' ratings, were found to be predictive of school grade failure and retention. In general, Beery VMI predictive correlations tend to decline with the increase in children's grade level. Perhaps as a result of the decrease in instructional focus on visual-spatial skills, such as printing, and an increase in focus on more language-based tasks with each increasing grade level.

Construct validity was established by correlating the Beery VMI results with the Beery VMI's supplemental subtests. The median correlation coefficient for the Beery VMI's supplemental subtests was .35 for the Visual Perception Index and .28 for the Motor Coordination Index (Beery & Beery, 2004).

Bender Visual-Motor Gestalt Test – Second Edition

The Bender Visual-Motor Gestalt Test – Second Edition (Bender-Gestalt II) measures visual-motor integration skills in children and adults from four to 85+ years of age (Brannigan & Decker, 2003). This test requires individuals to copy 16 figures onto a blank piece of paper to determine eye-hand coordination. There is also a supplementary recall portion of this test that can be administered immediately after the copy phase. In this portion of the test, individuals are required to copy the previously viewed figures onto another blank sheet of paper from memory. For the purpose of this study, data was only collected from the scores from the copy phase of the Bender-Gestalt.

Standardization sample

The standardization sample for the Bender-Gestalt II was based on a stratified and random sample that was intended to closely match the 2000 U.S Census (Brannigan & Decker, 2003). This sample consisted of 4,000 individuals from 4 to 85+ years of age with an approximately equal number of males and females, as well as ethnicity/racial groups. The sample was also stratified according to socio-economic status and geographical location.

Measures of reliability

The reliability of the Bender-Gestalt II was assessed through interrater reliability, internal consistency and test-retest reliability. Interrater reliability was determined by having five experienced raters examine the drawings of 30 individuals and the average reliability coefficient was .90 (Brannigan & Decker, 2003).

Internal consistency was determined using the split-half method (Brannigan & Decker, 2003). Using this method, the test items were separated into two components using an odd-even split and then each half of the test was correlated. The reliability coefficient was .91 with an average standard error of measurement (SEM) of 4.55, indicating that this test provides consistent and stable measurements.

Test-Retest reliability was determined by administering the Bender-Gestalt II to 213 individuals on two separate occasions (Brannigan & Decker, 2003). The correlation coefficients ranged from .80 to .88 for the copy phase.

Measures of validity

The validity of the Bender-Gestalt II was supported through content, criterion and construct related evidence. Content validity of the Bender-Gestalt II was established by adding new items to the previous edition following a process of item calibration using Rasch analysis (Brannigan & Decker, 2003). This type of analysis uses a logistical model that independently ranks the test items according to their level of difficulty and subject ability. The new items were also evaluated by 13 judges, who were identified as having expertise with the Bender-Gestalt, on the dimensions of difficulty and inclusion. Difficulty meaning how hard the item might be for someone to copy the figure relative to the existing Bender-Gestalt designs and inclusion was defined as the extent to which the items contained qualities similar to the original test items.

Criterion validity was established by correlating the Bender-Gestalt II with another valid measure of visual motor integration ability (concurrent validity) as well as with valid measures of academic and intellectual ability (predictive validity). To investigate the Bender-Gestalt II's relationship with other measures of visual-motor functioning, it was correlated with the Beery-Buktenica Developmental Test of Visual-Motor Integration – Fourth Edition – Revised (Beery VMI) (Brannigan & Decker, 2003). The correlation coefficients were .65 for the copy phase and .44 for the recall phase. Predictive validity was established by correlating the Bender-Gestalt with the Woodcock-Johnson III Tests of Achievement (WJ III ACH) to determine its relationship with measures of achievement. The correlation coefficients ranged from .27 to .53 for the copy phase and from .25 to .49 for the recall phase. Additionally, the Bender-Gestalt II was correlated to the Wechsler Individual Achievement Test – Second Edition (WIAT-II) composites and the coefficients ranged from .20 to .47 for the copy phase and .17 to .31 for the recall phase. The Bender-Gestalt II was also correlated with measures of intelligence, including the Stanford-Binet Intelligence Scales – Fifth Edition (SBV), the Wechsler Intelligence Scales for Children – Third Edition (WISC-III) and the Wechsler Adult Intelligence Scale – Third Edition (WAIS-III). When comparing the Bender-Gestalt II scores with the SBV IQs, the correlation coefficients ranged from .50 to .54 for the copy phase and .45 to .48 for the recall phase. The correlation coefficients for the WISC-III ranged from .37 to .69 for the copy phase and .19 to .38 for the recall phase. For the WAIS-III, the correlation coefficients ranged from .47 to .52 for the copy phase and .21 to .40 for the recall phase.

Beck's Anxiety Inventory

The Beck's Anxiety Inventory (BAI) is a 21-item scale that measures the severity of anxiety in adolescents and adults (Beck & Steer, 1993). The scores fall into four different ranges depending on the severity of the symptoms of anxiety: Minimal, Mild, Moderate and Severe.

Standardization sample

The norming sample consisted of 1,086 psychiatric outpatients, including 456 men (42.0% mean age = 36.4 years, SD = 12.4) and 630 women (58.0% mean age = 35.7 years, SD = 12.1) (Beck & Steer, 1993). The patients were diagnosed as having predominately mood and anxiety disorders. From this sample, 160 outpatients were studied extensively for reliability and validity of the scale.

Measures of reliability

The BAI has high internal consistency with a Cronbach coefficient alpha of .92 (Beck & Steer, 1993). As well, the BAI has good test-retest reliability. A sub-sample of 83 outpatients completed the BAI one week after completing an intake evaluation and before beginning therapy. The correlation between intake and one-week BAI scores was .75 ($p < .0001$).

Measures of validity

Validity for the BAI was assessed through content, criterion and construct related evidence. Content validity was established by ensuring that the items represented the symptoms of anxiety as presented in the Diagnostic and Statistical Manual of Mental Disorders – Third Edition – Revised (DSM-III-R) as guidelines for diagnosing individuals with anxiety disorders (Beck & Steer, 1993).

Criterion was established by correlating the BAI other valid measures of other valid self-report measures of clinically related anxiety (concurrent validity), including the Cognition Check List (CCL-A) and the State-Trait Anxiety Inventory (STAI)

(Beck & Steer, 1993). The BAI was correlated with the CCL-A, which measures the frequency of dysfunctional cognitions related to anxiety, and the coefficient was .51 (p < .0001). As well, the BAI significantly correlated with the Trait ($r = .58, p < .001$) and State ($r = .47, p < .001$) subscales of the State-Trait Anxiety Inventory (STAI).

Construct validity was established using intercorrelation and principle-factorial analysis studies. The BAI was constructed to minimize relationships with other constructs, such as depression (Beck & Steer, 1993). The correlation between the BAI and the Hamilton Psychiatric Rating Scale for Depression – Revised (HRSD) was significant ($r =.25, p < .05$) and the correlation coefficient with the Cognition Check List (CCL), which measures dysfunctional thoughts correlations related to depression, was .22 ($p < .05$). Additionally, the BAI was not related to hopelessness, as measured by the Beck Hopelessness Scale (BHS), which measures negative attitudes about the future and is consistent with depression, but not with anxiety.

Beck's Depression Inventory – Second Edition

The Beck's Depression Inventory – Second Edition (BDI-II) is a 21-item self-report instrument that measures the severity of depression in individuals over the age of 13 (Beck, Steer, & Brown, 1996). It is one of the most widely accepted instruments for assessing the severity of depression in diagnosed patients and for detecting possible depression in a normal population.

Standardization sample

The norming sample included individuals from four different psychiatric outpatient clinics and one college group (Beck, Steer, & Brown, 1996). All the outpatients were diagnosed by experienced psychologists or psychiatrists according to the Diagnostic and Statistical Manual of Mental Disorders – Third Edition – Revised (DSM-III-R) or Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV) criteria. In total, there were 317 women (63%) and 183 men (37%) with a mean age of 37.20 years (*SD* = 15.91). The sample had a racial/ethnic makeup of 91% (454) white, 4% (21) African-American, 4% (18) Asian-American, and 1% (7) Hispanic. The comparative normal sample consisted of 120 college students; this sample consisted of 67 women (56 %) and 53 men (44%). The mean age of this sample was 19.58 years (*SD* = 1.84) and the racial representation was predominately Caucasian.

Measures of reliability

Reliability of the BDI-II was assessed through internal consistency, test-retest reliability and interrater reliability. The BDI-II has excellent internal consistency with an alpha co-efficient of .92 for the outpatient sample and .93 for the college students (Beck, Steer, & Brown, 1996). Test-rest-retest reliability was determined by administering a subsample of 26 outpatients the BDI-II at the beginning of their first and second therapy sessions, which were one week apart. The first-session mean BDI-II total score was 20.27 (*SD* = 10.46) and the second-session mean BDI-II total score was 19.42 (*SD* = 10.38), producing a correlation of .93 ($p < .0001$).

Measures of validity

Validity of the BDI-II was established through criterion and construct related evidence. Criterion validity was established by correlating the BDI-II with another valid measure of depression, the Hamilton Psychiatric Rating Scale for Depression

(HRSD) (Beck, Steer, & Brown, 1996). The BDI-II positively correlated (*r* = .71) with the HRSD.

Construct validity was established by correlating the BDI-II with other psychological tests (convergent validity), including the Beck Hopelessness Scale (BHS), the Scale for Suicidal Ideation (SSI) and the Beck Anxiety Scale (BAI) (Beck, Steer, & Brown, 1996). The results showed that the BDI-II was positively correlated (*p* < .001) to both the Beck Hopelessness Scale (BHS) (*r* = .68) and the Scale for Suicidal Ideation (SSI), which are two psychological constructs that have been positively related to depression. As well, the BDI-II was positively correlated with the Beck Anxiety Scale (BAI) (*r* = .60, *p* < .001). Since depression and anxiety have correlated in clinical evaluation, this finding was to be expected. Additionally, evidence of the BDI-II factorial validity was demonstrated by the intercorrelations among the 21 BDI-II items (*r* = .95).

Behavior Assessment System for Children

The Behavior Assessment System for Children forms (Parent Rating Scales (PRS), Teacher Rating Scales (TRS) and Self-Report Scale (SRS) are multidimensional measures of behaviour and personality, including positive (adaptive) and negative (clinical) dimensions for individuals between the ages of 2 1/2 and 18 (Reynolds & Kamphaus, 1992). These scales are intended to evaluate an individual's personality, identify their behavioural problems and emotional disturbances, as well as their positive attributes. The PRS measures an individual's adaptive and problem behaviours in the community and at home; the TRS measures these areas of functioning in the school setting. The SRP form is an "omnibus personality" inventory (Reynolds & Kamphaus, p. 3). The BASC evaluates 11 to 14 behavioural dimensions depending on the child's age and form used (PRS, TRS or SRP) (see Appendix C for a description of the BASC-PRS, -TRS and -SRP subtests). These dimensions consist of 126 to 148 items that use a four-point Likert scale (never, sometimes, often and almost always) (PRS or TRS) and a True or False scale (SRP). Scores are measured in T-scores with an average of 50 and a standard deviation of 10. Clinically significant scores, which suggest a high level of maladjustment, must be at least two standard deviations over the mean (>70). Furthermore, the BASC offers four sets of norming sample: General, Female, Male and Clinical (Manual). For the purpose of this study, separate sex norms (Male and Female) were used in order to determine any possible differences between males and females.

Standardization sample

The norming sample consisted of 2,401 for the TRS, 3,483 for the PRS and 9,861 for the SRP form, and had an equal number of males and females for each sample group (Reynolds & Kamphaus, 1992). This sample was representative of U.S children between the ages of four and 18, which includes a representative proportion of exceptional children. Data was collected from 116 different test sites, which provided a variety of geographic locations, socioeconomic status, and culture and ethnicity. As well, each sample was weighted within gender so the distribution of race/ethnicity and parental education would parallel the recent population figures from the U.S Census. Children in special education, with behavioural-emotional disturbances, learning disabilities, and mild cognitive delay were also appropriately represented among the samples, however, there were relatively few children with diagnosed speech and language disabilities.

Measures of reliability

Reliability of the BASC was assessed in terms of internal consistency, test-retest stability and interrater reliability (Reynolds & Kamphaus, 1992). The internal consistency of the TRS scale and composite scores for all three age levels (preschool, child and adolescent) ranged from .67 to .97. For the PRS, the internal consistency was slightly lower with a range of .42 to .94 and the coefficients for the SRP ranged from .54 to .97.

To determine test-retest stability for the TRS and PRS forms, a random sample of children were rated by parents and teachers on two separate occasions and for the SRP form, a random sample of children completed the BASC on two separate occasions (Reynolds & Kamphaus, 1992). The test-retest reliability coefficients for the TRS were quite high, with median values of .89, .91 and .82 for the respective age levels (preschool, child and adolescent). For the PRS, the coefficients were also quite high with median values of .85, .88 and .70 for the three age levels respectively, and the correlation coefficients for all three age levels on the SRP form were all .76.

Interrater reliability for the TRS was high with a median of .83 (Reynolds & Kamphaus, 1992). The interparent correlations for the PRS were moderate, with median values of .46, .57 and .67 at the preschool, child and adolescent level respectively.

Measures of validity

Validity was established by correlating the BASC with other measures of behaviour, including the Achenbach Teacher Report Form, the Revised Behaviour Problem Checklist, the Conners' Teacher and Parents Rating Scales, Burks' Behaviour Rating Scales and the Behaviour Rating Profile (Reynolds & Kamphaus, 1992). Overall, these measures correlated moderately with the corresponding BASC measures.

The validity of the BASC scores can be jeopardized by several factors, including "failure to pay attention to item content, carelessness, an attempt to portray the child in a highly positive or negative light, lack of motivation to respond truthfully, or poor comprehension of the items" (Reynolds & Kamphaus, 1992, p. 55). To ensure the results are valid, there are three validity indexes built into the BASC – the *F* Index, *L* Index and *V* Index. The *F* index, which is included on the TRS, PRS and SRP forms, is a measure of an individual's tendency to "fake bad" (Reynolds & Kamphaus, p. 46) or to be excessively negative about the child's behaviour or self-perceptions and emotions. On the TRS and PRS forms, this *F* Index consists of items that represent maladaptive behaviours to which the respondent answered would consistently respond *Almost Always*, and adaptive behaviours to which the respondent answered would consistently respond *Never*. On the SRP, this *F* Index consists of *True* responses to negative statements that are infrequently endorsed and *False* responses to positive statements that are frequently endorsed by the normal population. For the adolescent level of the SRP form, the *L* Index measures the individual's tendency to "fake good" (Reynolds & Kamphaus, p. 12) and give an extremely positive picture of himself or herself. The index consists of items that are unrealistically positive statements ("I like everyone I meet" (Reynolds & Kamphaus, p. 12) or "I tell the truth every single time" (Reynolds & Kamphaus, p. 56) or are mildly self-critical statements that most people would endorse, such as "I sometimes get mad" (Reynolds & Kamphaus, p. 12. Individuals who are defensive and do not wish to disclose personal information are likely to score high on the *L* index. The *V* Index is also included in the SRP form and serves as a basic validity check. This Index is made up of nonsensical or highly implausible statements (such as "Superman is a real person" (Reynolds & Kamphaus, p. 12) or "I have never been to sleep" (Reynolds & Kamphaus, p. 57) to ensure the individual is paying close attention while answering the BASC statements and is not randomly selecting answers. If any of these Indexes are in the Caution or Extreme Caution range, the validity of the results should be questioned and interpreted with caution.

Behavior Assessment System for Children – 2nd Edition

The Behavior Assessment System for Children – Second Edition (Parent Rating Scales (PRS), Teacher Rating Scales (TRS) and Self-Report Scale (SRS)) is a multidimensional measure of behaviour and personality, including positive (adaptive) and negative (clinical) dimensions for individuals between the ages of 2 1/2 to 18 years (Reynolds & Kamphaus, 2004). These scales are intended to evaluate an individual's personality and identify their behavioural problems, emotional disturbances and positive attributes. The PRS measures an individual's adaptive and problem behaviours in the community and at home; the TRS measures these areas of functioning in the school setting. The SRP form is an "omnibus personality" inventory (Reynolds & Kamphaus, p. 4). The BASC-2 evaluates 11 to 14 behavioural dimensions depending on the child's age and form used (PRS, TRS or SRP) (see Appendix C for a description of the BASC-2 scales). These dimensions consist of 126 to 148 items that use a 4-point Likert scale (never, sometimes, often and almost always) (PRS or TRS) and a True or False scale (SRP). Scores are measured in T-scores with an average of 50 and a standard deviation of 10. Clinically significant scores, which suggest a high level of maladjustment, must be at least two standard deviations over the mean (>70). Furthermore, the BASC-2 offers four sets of norming sample: General, Female, Male and Clinical. For the purpose of this study, separate sex norms (Male and Female) are used in order to determine any possible differences between males and females.

Standardization sample

The norming sample consisted of 4,650 for the TRS, 4,800 for the PRS and 3,400 for the SRP form, and had an equal number of males and females for each sample group (Reynolds & Kamphaus, 2004). This sample was collected from over 375 sites and was representative of the population with respect to sex, socioeconomic status (determined by parental education), race/ethnicity, geographic region and classification of special education or gifted programs. Children either classified or diagnosed with emotional, behavioural or physical problems were appropriately represented in the samples, however, children with emotional and behavioural disturbances and speech and language disabilities were slightly overrepresented in the samples. For the college level SRP form (SRP-COL), the data was collected from 706 students between the ages of 18 and 25 who were attending various colleges, universities and technical schools throughout the U.S. In this sample, there was a slightly higher proportion of females.

Measures of reliability

Reliability of the BASC-2 was assessed in terms of internal consistency, test-retest stability and interrater reliability. The internal consistency of the TRS scale and composite scores were quite high and consistent across gender and age levels (preschool, child and adolescent) with median coefficients ranging from .84 to .89 (Reynolds & Kamphaus, 2004). For the PRS, the internal consistency median values were also high and ranged from .81 to .87 across all age levels. The median internal consistency coefficients for the SRP ranged from .79 to .83 across all ages ranges – child, adolescent and college.

To determine test-retest stability for the TRS and PRS forms, a random sample of children were rated by parents and teachers on two separate occasions and for the SRP form, a random sample of children completed the BASC-2 on two separate occasions (Reynolds & Kamphaus, 2004). The test-retest reliability coefficients for the TRS were quite high, with median values of .82, .86 and .81 for the three age levels respectively. For the PRS, the coefficients were also quite high with median values of .77, .84 and .81 for the three age levels respectively. The correlation coefficients for all three age levels of the SRP form was .76. The test-retest reliabilities were .71, .75 and .84 at the child, adolescent and college level respectively.

Interrater reliability for the TRS was high and the median coefficients were .65, .56 and .53 for the preschool, child and adolescent level respectively (Reynolds &

Kamphaus, 2004). The interparent correlations for the PRS were moderate, with median values of .74, .69 and .77 across the respective age groups.

Measures of validity

Validity was established by correlating the BASC-2 with other behaviour measures, including the Achenbach Scales, Conners' Rating Scales, Children's Depression Inventory, Revised, Children's Manifest Anxiety Scale, Brief Symptom Inventory, Beck's Depression Inventory-II, Minnesota Multiphasic Personality Inventory-2, Behaviour Rating Inventory of Executive Functioning and the previous edition of each BASC form (Reynolds & Kamphaus, 2004). Overall, these measures correlated moderately with the corresponding BASC-2 measure, which support good validity for this scale.

The validity of the BASC-2 scores can be jeopardized by several factors, including "failure to pay attention to item content, carelessness, an attempt to portray the child in a highly positive or negative light, lack of motivation to respond truthfully, or poor comprehension of the items" (Reynolds & Kamphaus, 2004, p. 69). To ensure the results are valid, there are three validity indexes built into BASC-2 – the *F* Index, *L* Index, *V* Index and the *Consistency* Index. The *F* index, which is included in the TRS, PRS and SRP forms, is a measure of an individual's tendency to "fake bad" (Reynolds & Kamphaus, p. 70) or to be excessively negative about the child's behaviour or self-perceptions and emotions. On the TRS and PRS forms, the *F* Index consists of items that represent maladaptive behaviours, to which the respondent would consistently answer *Almost Always,* and adaptive behaviours to which the respondent consistently answer *Never*. On the SRP, the *F* Index consists of *True* responses to negative statements that are endorsed relatively infrequently in the normal population and *False* responses to positive statements that are endorsed frequently in the normal population. For the adolescent level of the SRP form, the *L* Index measures the individual's tendency to "fake good" (Reynolds & Kamphaus, p. 70) and give an extremely positive picture of himself or herself. The *L* index consists of items that are unrealistically positive statements ("I like everyone I meet" (Reynolds & Kamphaus, p. 71) or "I tell the truth every single time" (Reynolds & Kamphaus, p. 71) or are mildly self-critical statements that most people would endorse, such as "I get mad at others" (Reynolds & Kamphaus, p. 71). Individuals who are defensive and do not wish to disclose personal information are likely to score high on the *L* index. The *V* Index is also included in the SRP form and serves as a basic validity check. This Index is made up of nonsensical or highly implausible statements (such as "I have never been to sleep" (Reynolds & Kamphaus, p. 71) or "I have never been in a car" (Reynolds & Kamphaus, p. 57) to ensure the individual is paying close attention while answering the BASC-2 statements and is not opposed to randomly selecting answers.. If any of these Indexes are in the Caution or Extreme Caution range, the validity of the results should be questioned and interpreted with caution.

Procedures

This study was based on a retrospective case design, in which archival data was collected and analyzed from the files of individuals assessed at the Education Clinic at the University of Alberta. The tests were administered and scored according to the respective standardization procedures by Master's and PhD level students enrolled in the Educational and Counselling Psychology program at the University of Alberta, under the supervision of a registered psychologist. The protocols were followed in the administration of each standardized assessment measure (i.e., SBV, BDI-II, and BASC-2) as per the respective manuals.

Data Collection

Once the assessments and assessment reports were completed, the results from the assessments were collected by the researcher. All the information was gathered from the individuals' files and the individuals were not contacted at any time by the researcher. The data that was collected included IQ factors and subtests scores, achievement scores, visual-motor scores, emotional and behavioral scores, demographic information (i.e., age and gender) and school information (i.e., current grade). The data was collected by the researcher from the individuals' files and was entered into a computer database.

Data Analysis

After the data were collected, it was entered into the Statistical Program for the Social Sciences (SPSS 15.0). The data was analyzed using univariate analysis of variance (ANOVA) (Ramsey & Schafer, 1997) with a significance level (alpha level) of $p < 0.05$. Age and grade were controlled for in the analysis. ANOVA is a statistical measure that assesses whether or not there is a difference between the sample groups' means and if there is a difference, whether or not this difference is statistically significant (Ramsey & Schafer, 1997). This significance test is about means; it assesses means differences by comparing the amounts of variability explained by different scores (Ramsey & Schafer). In ANOVA, the F-statistic is used, which is the "ratio of the variability among group means (mean square between groups) to the variability within the groups (mean square within groups)" (Mook, 2001, p. 208). As the F-statistic becomes larger, the frequency with which the results will occur by chance gets smaller (Mook). This statistical procedure was used because there were numerous variables on each assessment measure administered that had to be analyzed in order to determine whether or not there were significant differences between the male and female samples' scores.

The data were also analyzed to ensure it met the assumptions of normality, equal variance and consistency. The assumption of normality was assessed by visually evaluating the distributions of the data and evaluating its skewedness as well as measuring the descriptive statistics. The assumptions of equal variance and consistency were evaluated by Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root tests (Ramsey & Schafer, 1997). All of the variables tested met the assumptions of normality, equal variance and consistency.

Limitations and Delimitation

Limitations

The limitations of this study include the missing data from various subtests on the standardized assessment measures administered, the inconsistent administration of assessment measures, the limited types of assessment tools available to the clinicians, the variation in clinicians administering the assessments and the measures the clinicians chose to administer for each assessment. At the Education Clinic at the University of Alberta, most of the psycho-educational assessments were administered by different clinicians. As a result, there were a variety of assessment measures administered to each client and there was no consistency across the sample. Consequently, there was an inconsistent amount of data collected in each area of functioning (cognitive, academic, visual motor, behavioural and emotional) across the sample. In order to account for the missing data in each area of functioning, the data analysis procedures were conducted on each subtest for each measure separately. As well, this inconsistency was corrected for, as much as possible, by using the measures most frequently administered in the psycho-educational assessments at the Education Clinic.

This study was also limited by the variety of assessment tools available to the clinicians at the Education Clinic at the University of Alberta. Despite having a wide variety of assessment tools available to the clinicians that assess many different areas of functioning (cognitive, academic, visual-motor, emotional and behavioural, and adaptive functioning), there still remains a limit on the variety of tests available. For the purpose of this study, however, the tests available in the Education Clinic were more than adequate in representing the measures addressed in this study.

As well, this study was limited by the variation in clinicians administering the assessments. In the Education Clinic, clinicians are randomly assigned assessment clients from a referral list. This variation among clinicians may have had an effect on the reliability and validity of the results because there was no consistency in assessors across the sample. If so, the effect is likely to be minimal because each of the assessment measures used in the study have standardized administration procedures. Therefore, even though the assessment tools are administered by different clinicians, they would have been administered universally across all of the clients.

Another limitation of this study is the inconsistency of tests administered by the clinicians for each psycho-educational assessment. Typically, clinicians include certain types of tests as a part of a standard psycho-educational assessment; however, clinicians will also select certain types of tests based on the referral issue as well as the client's presentation. Clinicians also practice from a variety of theoretical perspectives and as a result, this may have an effect on the types of tests they chose to administer, such as projective or non-projective tests. Despite these factors, the clinicians at the Education Clinic typically administer a standard psycho-educational battery that includes measures of cognitive, academic, visual-motor, emotional and behavioural functioning, and adaptive functioning. To correct for this, as much as possible, this study used the assessment measures that were administered most consistently across each sample.

Delimitation

A delimitation of this study was the limited sample used from the Education Clinic at the University of Alberta. This sample was selected because of convenience and availability. The purpose of this study was to investigate gender differences in a clinical population, which do not generalize to the general population. However, even though this sample may not be representative to the general population, it may be indicative of individuals seen in treatment and assessment (Carlson, Shin, & Booth, 1999). Additionally, the age range of the sample was quite large, ranging from 3 to 61 years. This large age range may affect the reliability and validity of this study because there may be systematic differences that exist between age groups. To correct this, as much as possible, the data was separated into two groups, child (approximately 3 to 17 years) and adult (approximately 16 to 61 years). This minimal age separation was conducted because the study purpose was to understand the overall gender differences in children and adults, however, the analysis of smaller age ranges may have provided more information about the overall gender differences in both adults and children.

CHAPTER 4: RESULTS

This section presents the results of the data analyses according to each hypothesis devised for each area of functioning. A significance level of alpha .05 was used in the analysis.

Hypothesis 1

Ho: There will be no significant differences between males and female in the area of cognitive functioning.

Cognitive functioning in adults

Stanford-Binet Intelligence Scales, Fifth Edition (SBV)

On the SBV, there were no significant differences found between males and females in all areas of intellectual functioning. These areas include: Full Scale Intelligence Quotient (FSIQ), Verbal Intelligence Quotient (VIQ), Nonverbal Intelligence Quotient (NVIQ), Knowledge, Fluid Reasoning, Quantitative Reasoning, Visual Spatial and Working Memory.

Wechsler Adult Intelligence Scale, Third Edition (WAIS-III)

On the WAIS-III, there was a significant difference found between males and females in the area Verbal Intellectual functioning. Verbal Intellectual ability measures an individual's ability to think, reason, solve problems, visualize and recall important information presented in words and sentences (printed or spoken) (Wechsler, 2001). This ability also reflects an individual's capacity to explain verbal responses clearly and present a rationale for response choices. On this scale, males had a higher average VIQ of 99.65 compared to the females average VIQ of 92.58.

Table 2

Statistics for the Verbal IQ Scores on the WAIS-III

	N	**AGE**	**MEAN VERBAL IQ SCORE**	**F-STATISTIC**	**SIGNIFICANCE LEVEL (P<0.05)**
Female	45	31.23	92.58	6.175	0.015
Male	37	26.73	99.65	6.175	0.015

In all other areas of intellectual functioning, there were no significant differences found between males and female. These areas include: Performance Intelligence Quotient (PIQ), Verbal Comprehension, Perceptual Organization, Working Memory and Processing Speed.

Cognitive functioning in children

Stanford-Binet Intelligence Scales, Fifth Edition

On the SBV, there were no significant differences found between males and females in all areas of intellectual functioning. These areas include: FSIQ, VIQ, NVIQ, Knowledge, Fluid Reasoning, Quantitative Reasoning, Visual Spatial and Working Memory.

Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV)

On the WISC-IV, there was a significant difference found between males and females in the area Processing Speed. This subscale measures the speed at which an individual takes in, uses, stores, retrieves and expresses information (Wechsler, 2003).

It also assesses visual associative learning, fine motor coordination, visual-motor coordination, visual discrimination and concentration. On this subscale, females had a higher average Processing Speed of 95.91 compared to the males average Processing Speed of 90.33.

Table 3

Statistics for the Processing Speed Index on the WISC-IV

	N	AGE	MEAN PROCESSING SPEED INDEX SCORE	F-STATISTIC	SIGNIFICANCE LEVEL (P<0.05)
Female	56	11.39	95.91	4.664	0.032
Male	94	10.81	90.33	4.664	0.032

In all other areas of intellectual functioning, there were no significant differences found between males and female. These areas include: FSIQ, Verbal Comprehension, Perceptual Reasoning and Working Memory.

Hypothesis 2

Ho: There will be no significant differences between males and females in the area of academic functioning.

Academic functioning in adults

Wechsler Individual Achievement Test, Second Edition (WIAT-II)

On WIAT-II, there were no significant differences found between males and females in all areas of academic functioning. These areas include: Word Reading,

Reading Comprehension, Pseudoword Decoding, Numerical Operations, Math Reasoning, Spelling, Written Expression, Oral Comprehension and Oral Expression subscales, and the Reading, Mathematics, Written Language and Oral Language Composites.

Woodcock Johnson, Third Edition (WJ-III)

On the WJ-III, there were significant differences found between males and females on the Total Achievement and Writing Samples scale.

The Total Achievement scale represents a person's overall performance across the various achievement domains (McGrew & Woodcock, 2001). On this scale, males had a higher average score of 100.25 compared to the average female score of 96.80.

Table 4

Statistics for the Total Achievement Scores on the WJ-III

	N	AGE	MEAN TOTAL ACHIEVEMENT SCORE	F-STATISTIC	SIGNIFICANCE LEVEL (P<0.05)
Female	10	31.22	96.80	5.808	0.035
Male	4	25.55	100.25	5.808	0.035

The writing samples scale measures an individual's ability to write under a variety of demands and with quality expression (McGrew & Woodcock, 2001). On this scale, males had a higher average score of 103.25 compared to the average female score of 89.00.

Table 5

Statistics for the Writing Samples Scores on the WJ-III

	N	AGE	MEAN TOTAL ACHIEVEMENT SCORE	F-STATISTIC	SIGNIFICANCE LEVEL ($P<0.05$)
Female	10	31.22	89.00	6.646	0.019
Male	4	25.55	103.25	6.646	0.019

In all other areas of academic functioning, there were no significant differences found between males and female. These areas include: Letter-word Identification, Reading Fluency, Calculation, Math Fluency, Spelling, Writing Fluency, Passage Comprehension, Applied Problems, Writing Samples, Word Attack, Picture Vocabulary, Broad Reading, Math Reading, Broad Written Language and Total Achievement.

Wide Range Achievement Test, Third Edition (WRAT-3)

On the WRAT-3, there were no significant differences found between males and females in reading, writing and arithmetic.

Academic functioning in children

Wechsler Individual Achievement Test, Second Edition

On the WIAT-II, there were no significant differences found between males and females in all areas of academic functioning. These areas include: The Word Reading, Reading Comprehension, Pseudoword Decoding, Numerical Operations, Math Reasoning, Spelling, Written Expression, Oral Comprehension and Oral Expression subscales, and the Reading, Mathematics, Written Language and Oral Language Composites.

Woodcock Johnson, Third Edition

On the WJ-III, there were no significant differences found between males and females in all areas of academic functioning. These areas include: Letter-word Identification, Reading Fluency, Calculation, Math Fluency, Spelling, Writing Fluency, Passage Comprehension, Applied Problems, Writing Samples, Word Attack, Picture Vocabulary, Broad Reading, Math Reading, Broad Written Language and Total Achievement.

Wide Range Achievement Test, Third Edition

On the WRAT-3, there were no significant differences found between males and females in reading, writing and arithmetic.

Hypothesis 3

Ho: There will be no significant differences between males and females in the area of visual-motor functioning.

Visual-motor functioning in adults

Beery-Buktenica Developmental Test of Visual-Motor Integration (Beery VMI)

On the Beery VMI, there were no significant differences found between males and females in regards to their visual-motor integration ability.

Bender Visual-Motor Gestalt Test, Second Edition (Bender-Gestalt II)

On the Bender-Gestalt II, there were no significant differences found between males and females in regards to their visual-motor integration ability.

Visual-motor functioning in children

Beery-Buktenica Developmental Test of Visual-Motor Integration

On the Beery VMI, there were no significant differences found between males and females in regards to their visual-motor integration ability.

Hypothesis 4

Ho: There will be significant differences between males and females in the area of emotional and behavioural functioning. Males will scores higher on the externalizing behaviour scales, where as females will score higher on the internalizing behaviour scales.

Emotional and behavioural functioning in adults

Beck's Anxiety Inventory (BAI)

On the BAI, there were no significant differences found between males and females in their levels and feelings of anxiety.

Beck's Depression Inventory, Second Edition (BDI-II)

On the BDI-II, there were no significant differences found between males and females in their levels and feelings of depression.

Behavior Assessment System for Children, 2nd Edition, Self-Report (BASC-2-SRP)

On the BASC-2-SRP, there were significant differences found between males and females on the locus of control and relationships with parents' scales, as well as on the personal adjustment composite and the emotional symptom index.

The locus of control scale measures an individual's perception of what controls the various events in his or her life as well as one's overall attribution system (Reynolds & Kamphaus, 2001). Low scores on this scale indicate an internal locus of control where individuals feel as though they have control over their successes or failures. High scores on this scale indicate an external locus of control where individuals feel as though their successes or failures are determined by external forces beyond their control. These external forces typicality include authority figures, such as parents and teachers. "High scorers have a sense of helplessness – a "Why bother?" attitude – and may believe strongly in luck" (Reynolds & Kamphaus, pg. 76). Individuals who have higher scores will tend to project blame for all their problems onto others, including peers, parents and teachers. They will also tend to believe that, even when behaving as expected, they will not be rewarded systematically. On this scale, females had a higher average score of 62.33 compared to the average male score of 52.00.

Table 6

Statistics for the Locus of Control Scores on the BASC-2-SRP

	N	**AGE**	**MEAN LOCUS OF CONTROL SCORE**	**F-STATISTIC**	**SIGNIFICANCE LEVEL (P<0.05)**
Female	9	18.44	62.33	9.044	0.008
Male	11	20.91	52.00	9.044	0.008

The relationships with parents scale measures an individual's perception of being important in the family, the status of the parent-child relationship and the individual's perception of the level of trust and concern in the parent-child relationship (Reynolds & Kamphaus, 2004). High scores on this scale indicate a positive level of adjustment and low scores indicate a tendency towards exhibiting some conduct disorder behaviours. Low scorers may be prone to acting out or may appear reserved and experience feelings of inadequacy. On this scale, females had a lower average score of 38.89 compared to the average male score of 53.73.

Table 7

Statistics for the Relations with Parents Scores on the BASC-2-SRP

	N	**AGE**	**MEAN RELATIONS WITH PARENTS SCORE**	**F-STATISTIC**	**SIGNIFICANCE LEVEL (P<0.05)**
Female	9	18.44	38.89	7.869	0.014
Male	11	20.91	53.73	7.869	0.014

The personal adjustment composite measures an individual's overall level of personal adjustment in life (Reynolds & Kamphaus, 2004). High scores on this composite indicate a positive level of adjustment. Scores within the At-Risk range (Score at or below 40) suggests that the individual may have problems with interpersonal relationships, self-acceptance, identity development and ego strength. Individuals who have low scores tend to be withdrawn and introverted. They also have a tendency to repress uncomfortable feelings and thoughts and have few positive outlets for their problems. On this scale, females had a lower average score of 40.11 compared to the average male score of 50.73.

Table 8

Mean Personal Adjustment Scores for the Female Adult Sample on the BASC-2-SRP

	N	AGE	MEAN PERSONAL ADJUSTMENT SCORE	F-STATISTIC	SIGNIFICANCE LEVEL (P<0.05)
Female	9	18.44	40.11	5.924	0.026
Male	11	20.91	50.73	5.924	0.026

The Emotional Symptom Index is the most global indicator of serious emotional disturbances, particularly internalizing disorders (Reynolds & Kamphaus, 2004). Elevated scores on this scale will likely always indicate the presence of serious emotional disturbance that is broad-based in its impact on the individual's thought and feelings. On this scale, females had a higher average score of 61.78 compared to the average male score of 52.00.

Table 9

Statistics for the Emotional Symptom Index on the BASC-2-SRP

	N	AGE	MEAN EMOTIONAL SYMPTOM INDEX SCORE	F-STATISTIC	SIGNIFICANCE LEVEL (P<0.05)
Female	9	18.44	61.78	4.908	0.040
Male	11	20.91	52.00	4.908	0.040

In all other areas of emotional and behavioural functioning, there were no significant differences found between males and females. These areas include: Alcohol Abuse, Anxiety, Attention Problems, Attitudes to School, Attitudes to

Teachers, Atypicality, Depression, Hyperactivity, Interpersonal Relations, School Maladjustment, Self-esteem, Self-reliance, Sensation Seeking, Sense of Inadequacy, Social Stress, Somatization, School Problems, Internalizing Problems and Inattention/Hyperactivity.

On BASC-2-PRS, there were no significant differences found between males and females in all areas of emotional and behavioural functioning. These areas include: Hyperactivity, Aggression, Conduct Problems, Externalizing Problems, Anxiety, Depression, Somatization, Internalizing Problems, Atypicality, Withdrawal, Attention Problems, Behavioral Symptoms Index, Adaptability, Social Skills, Leadership, Activities of Daily Living, Functional Communication, Adaptive Skills, Anger Control, Bullying, Developmental Social Disorders, Emotional Self-Control, Executive Functioning, Negative Emotionality and Resiliency.

Behavioural and emotional functioning in children

Behavior Assessment System for Children, Self-Report (BASC-SRP)

On BASC-SRP, there were significant differences found between males and females on scales measuring sensation seeking and somatization.

The sensation seeking scale measures an individual's desire to engage in potentially hazardous and/or exciting activities (Reynolds & Kamphaus, 1992). On this scale, females had a higher average score of 58.60 compared to the average male score of 50.15.

Table 10

Statistics for the Sensation Seeking Scores on the BASC-SRP

	N	AGE	MEAN SENSATION SEEKING SCORE	F-STATISTIC	SIGNIFICANCE LEVEL ($P<0.05$)
Female	15	10.89	58.60	9.093	0.005
Male	26	11.82	50.15	9.093	0.005

The somatization scale measures an individual's tendency to be overly sensitive and complain about relatively minor physical problems and discomforts, in addition to the expression of psychological difficulties (Reynolds & Kamphaus, 1992). This scale also evaluates the level and nature of serious-health related problems, fears and concerns; these physical complaints may be experienced as real or imagined. On this scale, females had a higher average score of 55.79 compared to the average male score of 45.42.

Table 11

Statistics for the Somatization Scores on the BASC-SRP

	N	AGE	MEAN SOMATIZATION SCORE	F-STATISTIC	SIGNIFICANCE LEVEL ($P<0.05$)
Female	35	10.89	55.79	6.454	0.016
Male	49	11.82	45.42	6.454	0.016

In all other areas of emotional and behavioural functioning, there were no significant differences found between males and females. These areas include: Anxiety, Attitudes to School, Attitudes to Teachers, Atypicality, Depression, Hyperactivity, Interpersonal Relations, Locus of Control, Relations with Parents, Self-esteem, Self-reliance, Sense of Inadequacy, Social Stress, Clinical Maladjustment, School Maladjustment, Personal Adjustment and Emotional Symptoms Index.

Behavior Assessment System for Children, Parent Rating Scales (BASC-PRS)

On BASC-PRS, there were no significant differences found between males and females in all areas of emotional and behavioural functioning. These areas include: Adaptability, Anxiety, Aggression, Attention Problems, Atypicality, Conduct Problems, Depression, Hyperactivity, Leadership, Learning Problems, Social Skills, Somatization, Study Skills, Withdrawal, Study Skills, Externalizing Problems, Internalizing Problems, School Problems, Adaptive Skills and Behavioural Symptoms Index.

Behavior Assessment System for Children – Teacher Rating Scales (BASC-TRS)

On the BASC-TRS, there were significant differences found between males and females on the anxiety, learning problems and study skills scales.

The anxiety scale measures the level of anxiety an individual experiences, including the tendency to be nervous, fearful or worried about real or imagined problems (Reynolds & Kamphaus, 1992). On this scale, females had a higher average score of 54.89 compared to the average male score of 50.79.

Table 12

Statistics for the Anxiety Scores on the BASC-TRS

	N	AGE	MEAN SOMATIZATION SCORE	F-STATISTIC	SIGNIFICANCE LEVEL (P<0.05)
Female	47	11.04	54.89	4.998	0.027
Male	65	10.62	50.79	4.998	0.027

The learning problems scale measures the presence of academic difficulties, particularly in understanding or completing work (Reynolds & Kamphaus, 1992). This scale is helpful in screening for or diagnosing learning disabilities and underachievement. There are a variety of academic skills, including reading, writing, mathematics and organizational skills, that this scale samples. On this scale, females had a higher average score of 60.36 compared to the average male score of 55.56.

Table 13

Statistics for the Learning Problems Scores on the BASC-TRP

	N	AGE	MEAN LEARNING PROBLEMS SCORE	F-STATISTIC	SIGNIFICANCE LEVEL (P<0.05)
Female	47	11.04	60.36	4.844	0.030
Male	65	10.62	55.56	4.844	0.030

The study skills scale reflects academic difficulties including failure to complete assignments problems, which may be the first step in the deterioration of school performance that is associated with developing depression or conduct disorder

(Reynolds & Kamphaus, 1992). Scores in the At-Risk range or lower may be indicative of more substantial behavior problems to come. On this scale, males had a higher average score of 44.25 compared to the average female score of 40.09.

Table 14

Statistics for the Study Skills Scores on the BASC-TRP

	N	AGE	MEAN STUDY SKILLS SCORE	F-STATISTIC	SIGNIFICANCE LEVEL (P<0.05)
Female	47	11.04	40.09	5.088	0.026
Male	61	10.62	44.25	5.088	0.026

In all other areas of emotional and behavioural functioning, there were no significant differences found between males and females. These areas include: Adaptability, Aggression, School Problems, Atypicality, Conduct Problems, Depression, Hyperactivity, Leadership, Social Skills, Somatization, Withdrawal, Externalizing Problems, Internalizing Problems, Adaptive Skills and Behavioural Symptoms Index.

Behavior Assessment System for Children – 2nd Edition – Self-Report (BASC-2-SRP)

On the Behavior Assessment System for Children – 2nd Edition – Self-Report (BASC-SRP), there were no significant differences found between males and females in all areas of emotional and behavioural functioning. These areas include: Anxiety, Attitude to School, Attitude to Teachers, Atypicality, Depression, Interpersonal Relations, Locus of Control, Relations with Parents, Self-esteem, Self-Reliance, Sensation Seeking, Sense of Inadequacy, Social Stress, Somatization, Clinical

Maladjustment, School Maladjustment, Personal Maladjustment and Emotional Symptoms Index.

Behavior Assessment System for Children – 2nd Edition – Parent Rating Scales (BASC-2-PRS)

On the BASC-2-PRS, there were no significant differences found between males and females in all areas of emotional and behavioural functioning. These areas include: Activities of Daily Living, Adaptability, Aggression, Anxiety, Attention Problems, Atypicality, Conduct Problems, Depression, Functional Communication, Hyperactivity, Leadership, Learning Problems, Social Skills, Somatization, Study Skills, Withdrawal, Executive Functioning, Externalizing Problems, Internalizing Problems, School Problems, Behavioural Symptoms Index and Adaptive Skills.

Behavior Assessment System for Children, 2nd Edition, Teacher Rating Scales (BASC-2-TRS)

On the BASC-2-TRS, there were significant differences found between males and females on scales measuring atypicality and executive functioning.

The atypicality scale measures an individual's tendency to behave in ways that are immature, considered "odd," or commonly associated with psychosis (such as experiencing visual and auditory hallucinations (Reynolds & Kamphaus, 2004, p. 48). T-scores higher than 60 on this scale may also indicate other problems behaviours, such as chewing clothes or blankets, babbling to oneself, eating nonfood items, rocking and humming to oneself, which could all be indicators of immaturity or developmental delay. On this scale, males had a higher average score of 62.78 compared to the average female score of 53.55.

Table 15

Statistics for the Atypicality Scores on the BASC-2-TRP

	N	AGE	MEAN ATYPICALITY SCORE	F-STATISTIC	SIGNIFICANCE LEVEL (P<0.05)
Female	20	10.30	53.55	4.804	0.032
Male	45	10.04	62.78	4.804	0.032

The executive functioning content scale measures the ability to control behaviour by planning, anticipating, inhibiting or maintaining goal-directed activity and by appropriately accepting environmental feedback in a purposeful and meaningful way (Reynolds & Kamphaus, 2004). Individuals with elevated scores may experience self-regulation difficulties and may present with symptoms of Attention-Deficit Hyperactivity Disorder (ADHD). On this scale, males had a higher average score of 57.33 compared to the average female score of 49.56.

Table 16

Statistics for the Executive Functioning Scores on the BASC-2-TRP

	N	AGE	MEAN EXECUTIVE FUNCTIONING SCORE	F-STATISTIC	SIGNIFICANCE LEVEL (P<0.05)
Female	20	10.30	49.56	4.465	0.043
Male	45	10.04	57.33	4.465	0.043

In all other areas of emotional and behavioural functioning, there were no significant differences found between males and females. These areas include: Activities of Daily Living, Adaptability, Aggression, Anxiety, Conduct Problems, Depression, Functional Communication, Hyperactivity, Attention Problems, Leadership, Learning Problems, Social Skills, Somatization, Study Skills, Withdrawal, Externalizing Problems, Internalizing Problems, School Problems, Behavioural Symptoms Index and Adaptive Skills.

Hypothesis 5

Ho: In the areas of functioning where significant gender differences are found, females will be lower functioning compared to males.

When significant gender differences were found in the areas of cognitive, academic, emotional and behavioural functioning, overall, the males tended to perform higher and have relatively better behavioural and emotional functioning compared to the females. This finding applied to all areas of functioning where there were gender differences, except for on the Processing Speed Index on the WISC-IV, and the Atypicality and Executive Functioning scales on the BASC-2-TRS. In these areas of functioning, males tended to perform at a lower level and had relatively more emotional and behavioural difficulties.

Conclusions

In general, males and females performed similarly in most areas of cognitive, academic, visual-motor, and emotional and behavioural functioning (for a summary of the results among the adult sample and the child sample for all the variables assessed see Appendix D and Appendix E respectively). Gender differences were found in the area of verbal intellectual functioning, processing speed, total achievement, writing samples, study skills, atypicality, executive functioning, locus of control, relations with parents, personal adjustment, emotional symptoms, sensation seeking, anxiety, somatization and learning problems. As well, in these areas of functioning, except on the variables measuring processing speed, atypicality and executive functioning, the males tended to be higher functioning compared to the females.

CHAPTER 5: DISCUSSION

The objective of this study was to assess gender differences of a clinic-referred population in the area of cognitive, academic, visual-motor and emotional and behavioural functioning. Relating to these objectives, this chapter will summarize the results of this study, relate these findings to previous research in the field, present possible conclusions and provide recommendations for future research.

Gender Differences

Summary of research findings

Cognitive functioning

This study found significant gender differences among the adult sample in the area of verbal intellectual functioning. Among the child sample, significant gender differences were found in the area of processing speed. For the adults, there were no significant gender differences found on the Stanford-Binet Intelligence Scales – Fifth Edition (SBV), however, on the Wechsler Adult Intelligence Scale – Third Edition (WAIS-III), there was a significant difference found between males and females in the area of Verbal Intellectual functioning. On this scale, males had a slightly higher Verbal Intelligence Quotient (VIQ) compared to females' average VIQ, indicating that males tend to have a higher ability to think, reason, solve problems, visualize and recall important information presented in words and sentences (printed or spoken) (Wechsler, 2001). This also indicates that males have a better capacity to explain verbal responses clearly and present a rationale for response choices. For the children, there were no significant gender differences found on the Stanford-Binet Intelligence Scales – Fifth Edition (SBV), however, on the Wechsler Intelligence Scale for

Children – Fourth Edition (WISC-IV), there was a significant difference found between males and females in the area of Processing Speed. On this scale, females had a slightly higher processing speed compared to males, indicating that females had a higher ability to take in, use, store, retrieve and express information (Wechsler, 2003). Also, this indicates that females have superior associative learning, fine motor coordination, visual-motor coordination, visual discrimination and concentration. Even though there were gender differences found in certain areas of functioning, overall there were no consistent differences across the assessment measures.

Academic functioning

This study found significant gender differences among the adult sample in the area of total achievement and writing samples, however, there were no significant gender differences found among the child sample. For the adults, there were no significant differences found between males and females on the Wechsler Individual Achievement Test – Second Edition (WIAT-II) or on the Wide Range Achievement Test – Third Edition (WRAT-3). On the Woodcock Johnson – Third Edition (WJ-III), however, there were significant differences found between males and females on the total achievement and writing samples' scales. On the total achievement scale, males had a slightly higher score compared to females, indicating that the males have a higher level of overall performance across the various achievement domains (McGrew & Woodcock, 2001). Males also had a higher score compared to females on the writing samples' scale, which indicates that males have a superior ability to write under a variety of demands and with quality expression. For the children, there were no significant differences found between males and females on the WIAT-II, WJ-III and the WRAT-3. While there were slight gender differences in certain areas of functioning, there were no consistent differences found between males and females across the assessment measures.

Visual-motor functioning

The results of this study confirmed the hypothesis that there would be no significant gender differences in the area of visual-motor functioning. For the adults, there were no significant differences found between males and females on the Beery-Buktenica Developmental Test of Visual-Motor Integration – Fourth Edition – Revised (Beery VMI) and on the Bender Visual-Motor Gestalt Test – Second Edition (Bender-Gestalt II). For the children, there were no significant differences found between males and females on the Beery VMI. These results indicate that both males and females have an equal ability to integrate their visual and motor abilities (eye-hand coordination).

Emotional and behavioural functioning

The results of this study confirmed the hypothesis that there would be significant gender differences in the area of emotional and behavioural functioning. Conversely, the results did not confirm that males would score higher on the externalizing behaviour scales and females would score higher on the internalizing behaviour scales. For the adults, there were no significant differences found between males and females on the Beck's Anxiety Inventory (BAI) and the Beck's Depression Inventory – Second Edition (BDI-II). On the Behavior Assessment System for Children, 2nd Edition – Self-Report (BASC-2-SRP), there were significant differences found between males and females on scales measuring locus of control, relationships with parents, personal adjustment and emotional symptoms. On the locus of control scale, females had a higher score compared to males. This indicates that females have an external locus of control where they believe their successes and failures are determined by forces beyond their control, which includes authority figures (Reynolds & Kamphaus, 1992). Furthermore, this indicates that females tend to project blame for their problems onto others, including peers, parents, and teachers and also tend to believe that even when behaving as expected, they will not be rewarded systematically. The males, on the other hand, have an internal locus of control where they believe they have control of events and control over their successes and failures. On the relationships with parents' scales, females had a much lower score compared to males. This indicates that the females referred for clinical services have a tendency to exhibit some conduct disorder behaviours and are prone to acting out. This also indicates that they may appear reserved and have feelings of inadequacy. Conversely, males referred for clinical services tended to have a more positive perception of being important in the family and level of adjustment in their parent-child relationship(s). On the personal adjustment composite, females also had a much lower score compared to males. This indicates that the females have more problems with interpersonal relationships, self-acceptance, identity development and ego strength compared to the males. Overall, the males had a higher level of personal adjustment in life. On the emotional symptom index, females had a lower average score compared to the males, indicating that the females have more serious emotional disturbances compared to the males.

For the children, there were no significant differences found between males and females on the Behavior Assessment System for Children – Parent Rating Scales (BASC-PRS). There were, however, significant differences found between males and females on the Behavior Assessment System for Children – Self-Report (BASC-SRP) on scales measuring sensation seeking, somatization and study skills. On the sensation seeking scale, females had a higher score compared to males. This indicates that the females tend to engage in more potentially hazardous and exciting activities (Reynolds & Kamphaus, 1992). On the somatization scale, the females had a higher score compared to the males. This indicates that the females tend to be overly-sensitive and complain about relatively minor physical problems and discomforts, as well as express more psychological difficulties. There were also significant differences found between males and females on the Behavior Assessment System for Children – Teacher Rating Scales (BASC-TRS) on scales measuring anxiety, learning problems and study skills. On the anxiety scale, the females had a higher score compared to the males. This indicates that the females experience higher levels of anxiety, including the tendency to be nervous, fearful or worried about real or imagined problems. On the learning problems scale, females also had a higher score compared to males. This indicates that females tend have the presence of more academic difficulties, particularly with understanding and completing work. On the study skills scale, males had a higher score compared to females, indicating that the males tend to have more academic difficulties, such as failing to complete their school assignments.

There were no significant differences found between males and females on the Behavior Assessment System for Children – 2nd Edition – Self-Report (BASC-2-SRP) and on Behaviour Assessment System for Children – 2nd Edition – Parent Rating scales (BASC-2-PRS). There were, however, significant differences found between males and females on the Behavior Assessment System for Children – 2nd Edition – Teacher Rating Scales (BASC-2-TRS) on scales measuring atypicality and executive functioning. On the atypicality scale, males had a higher score compared to females. This indicates that males tend to behave in ways that are immature, considered "odd" and/or commonly associated with psychosis (such as experiencing visual and auditory hallucinations) (Reynolds & Kamphaus, 2004, p. 48). On the executive functioning scale, males also had a higher score compared to females. This indicates that males are unable to control behaviours by planning, anticipating, inhibiting or maintaining goal-directed activity.

Overall level of functioning

The results of this study also confirmed that in all the areas of functioning where significant gender differences were found, males referred for clinical services tended to perform higher and have relatively better emotional and behavioural functioning compared to females. This finding applied to all areas of functioning where gender differences were found, except for the processing speed index on the WISC-IV and the atypicality and executive functioning scales on the BASC-2-TRS. In these areas of functioning, males tended to perform at a lower level and had relatively more emotional and behavioural difficulties.

Comparing the current findings to previous research

This research study attempted to build on previous research by looking at gender differences in a clinic-referred sample across a variety of areas. These areas include cognitive, academic, visual-motor and emotional and behavioural functioning. Overall, this study provides support for some of the main findings in previous literature and also provides some new findings in certain areas of functioning.

Cognitive functioning

Previous research has shown minimal gender differences in cognitive ability, mostly because standardized intelligences tests are designed to reduce major gender differences in test performance (Vogel, 2001; Halpern & LaMay, 1992; Makintosh, 1996). However, despite this attempt to minimize gender differences on these measures, gender differences have been found in verbal, nonverbal and spatial ability, as well as memory (Maccoby & Jacklin, 1974). Research has shown that females tend to have superior verbal ability and memory (Herlitz & Nilsson, 1998) and that males tend to have superior nonverbal and visual-spatial abilities (Maccoby & Jacklin, 1974). The results of this study found only a slight difference in verbal functioning among adults on one of the standardized intelligence measures (WAIS-III). Males were found to have a higher verbal ability compared to females. This research study did not find any differences in visual-spatial and nonverbal abilities or memory. The only other gender difference in cognitive functioning was found among the children in their processing speed ability. Females were found to have a higher processing speed ability compared to the males. Consequently, the results of this study are not consistent with the main findings in the literature on cognitive functioning.

Academic functioning

It has become widely accepted that from a young age, males have a superior mathematical ability and females possess greater verbal facility (Beyer, 1995). In general, academic performance tends to be similar during childhood and become more apparent during adolescence and adulthood, although it is now being proposed that these gender differences are a result of negative performance outcomes that develop from individuals performing in accordance with confirmed cultural stereotypes (Good, Aronson, & Inzlicht, 2003). The results of this study only found gender differences in academic functioning among adults on one of the standardized measures (WJ-III). Males were found to have higher overall academic performance and superior writing ability. These results are not consistent with the main findings in the literature on academic functioning and although they are consistent with the gender-similarities hypothesis, this study did not find significant gender differences on all three of the academic measures (WIAT-II, WJ-III and WRAT-3).

Visual-motor functioning

Since visual-motor integration (VMI) is a subgroup of visual-spatial abilities, there has been limited research conducted on gender differences in this specific area of functioning. Most of the research has focused on the differences between males' and females' visual-spatial functioning. In looking at VMI ability, one would hypothesize that males would have superior VMI ability compared to females because the research has shown males to have superior visual-spatial abilities, however, females have been found to have a superior VMI ability from childhood through to adulthood (Vogel, 2001). The results of this study found no gender differences in VMI abilities among adults and children and are therefore inconsistent with the main findings in the literature on visual-motor functioning.

Emotional and behavioural functioning

The issue of gender difference in emotional and behavioural functioning is among one of the most controversial and highly-debated issues in society. In general, emotional and behavioural problems are dichotomized into two empirically established groups that either reflect internalizing types of problems (anxiety, depression, withdrawal, stress and eating disorders) or externalizing types of problems (aggression, oppositional behaviours, school problems and delinquency) (Achenbach, 1991). Research has shown that females tend to experience more internalizing types of emotions (such as shame, guilt, hurt, fear, and anxiety) (Brooks-Gunn & Peterson, 1991; Broberg, Ekeroth, Gustafsson, Hansson, Hägglöf, Ivarsson, Larsson, 2001), whereas males tend to experience more externalizing emotions (such as aggression, hyperactivity and delinquency) (Broberg et al.). The results of this study found gender differences in some areas of emotional and behavioural functioning. Among the adults, gender differences in emotional and behavioural functioning were only found on one of the standardized measures (BASC-2-SRP). These gender differences were not found on the internalizing or externalizing scales, but were found on the scales measuring locus of control, relationships with parents, personal adjustment and emotional symptoms. The scales that measured these areas of functioning did not show any significant differences between males and females, which is inconsistent with the literature on emotional and behavioural functioning. Among the children, there were significant differences found between males and females on the BASC-

SRP, BASC-TRS and BASC-2-TRS. The scales where there were gender differences included sensation-seeking, somatization, anxiety, learning problems, study skills, atypicality and executive functioning. Females demonstrated higher externalizing behaviours on scales measuring sensation-seeking and learning problems and males demonstrated more externalizing behaviours on the atypicality, executive functioning and study skills scales. Internalizing behaviours were only shown by females on the somatization and anxiety scales. Overall, these results are inconsistent with the findings in the literature because the females demonstrated more externalizing and internalizing behaviours compared to males.

Conclusions

In general, males and females performed similarly in most areas of cognitive, academic, visual-motor and emotional and behavioural functioning. Gender differences were found in the area of verbal intellectual functioning, processing speed, total achievement, writing samples, study skills, atypicality, executive functioning, locus of control, relations with parents, personal adjustment, emotional symptoms, sensation seeking, anxiety, somatization and learning problems (for a listing of the significant gender differences found in this study and their respective statistics see Table 17). As well, in these areas of functioning, except on the variables measuring processing speed, atypicality and executive functioning, the males tended to be higher functioning compared to the females.

Table 17

Summary of the Significant Gender Differences Found Using ANOVA

Assessment Measure	Variable	Sample	F-Level	Significance Level ($p<0.05$)	Mean Female Score	Mean Male Score
WAIS-III	Verbal Intelligence Quotient	Adult	6.175	0.015	92.58	99.65
WISC-IV	Processing Speed Index	Child	4.664	0.032	95.91	90.33
WJ-III	Total Achievement	Adult	5.808	0.035	96.80	100.25
	Writing Samples	Adult	6.646	0.019	89.00	103.25
BASC-2-SRP	Locus of Control	Adult	9.044	0.008	62.33	52.00
	Relations with Parents	Adult	7.869	0.014	38.89	53.73
	Personal Adjustment	Adult	5.924	0.026	40.11	50.73
	Emotional Symptom Index	Adult	4.908	0.040	61.78	52.00
BASC-SRP	Sensation Seeking	Child	9.093	0.005	58.60	50.15
	Somatization	Child	6.454	0.016	55.79	45.42
BASC-TRP	Anxiety	Child	4.998	0.027	54.89	50.79
	Learning Problems	Child	4.844	0.030	60.36	55.56
	Study Skills		5.088	0.026	40.09	44.25
BASC-2-TRP	Atypicality	Child	4.804	0.032	53.55	62.78
	Executive Functioning	Child	4.465	0.043	49.56	57.33

One reason the results of this study may not be consistent with the literature could be a result of the clinic-referred sample. The sample used in this study consisted of individuals who were referred to the Education Clinic at the University of Alberta for a variety of cognitive, academic, and behavioural and emotional concerns. These individuals were initially seeking a psycho-educational assessment because they were already experiencing difficulty in one or more areas of functioning. This may explain why some of the results showed males having deficits not typically found in the literature, including the areas of processing speed, total achievement and writing ability. Furthermore, the use of a clinic-referred sample may also explain why some of the results showed females having deficits not typically found in the literature, including the areas of locus of control, relations with parents, personal adjustment, sensation seeking and learning problems.

Another reason for this discrepancy with the literature may have resulted from the different battery of assessment measures administered to each individual. At the Education Clinic, most of the psycho-educational assessments were administered by different clinicians. As a result, there were a variety of assessment measures administered to each client and there was no consistency across the sample. Consequently, there was an inconsistent amount of data collected in each area of functioning (cognitive, academic, visual motor, and emotional and behavioural) as well as an inconsistency in the administration of assessment measures across the sample. These inconsistencies may have had unforeseen effects on the results of this study and there may also have been individual differences among the sample groups that could have accounted for some of the gender differences that were found or not found in this study. The data analysis procedure, however, was conducted in such a way as to account for the missing data in each area of functioning, which likely minimized the possible effects of these inconsistencies in the results. As well, these inconsistencies were corrected for, as much as possible, by using the assessment measures most consistently administered across the sample.

It is not known whether some of the gender differences found or not found in this study were a result of the clinic-referred sample, the inconsistently administered assessment measures, the possible individual difference among the samples, or actual gender differences. In general, however, the results of this study support Hyde's (2005) gender-similarities hypothesis, which holds that males and females are more alike than they are different. In the area of cognitive, academic, visual-motor and emotional and behavioural functioning, when there were gender differences found, they were not consistent across all the assessment measures. These gender differences included verbal intellectual functioning, processing speed, total achievement, writing samples, study skills, atypicality, executive functioning, locus of control, relations with parents, personal adjustment, emotional symptom index, sensation seeking, anxiety, somatization and learning problems. This study's findings pave the way for new research in the field and do not support society's commonly-held beliefs about gender differences. "It is time to consider the costs of overinflated claims of gender differences. Arguably, they cause harm in numerous realms, including women's opportunities in the workplace, couple conflict and communication, and analyses of self-esteem problems among adolescents. Most importantly, these claims are not consistent with the scientific data" (Hyde, 2005, p. 590). Overall, this study's findings do not support the overinflated claims of the differences between males and females, but promotes more realistic beliefs and a new perspective on gender differences.

Issues in Treatment and Education

An in-depth understanding of the issue of gender differences has important implications for schools, counsellors and parents. In general, individuals tend to base their ideas and judgments about males and females on gender stereotypes and hold onto the notion that males and females are more different than alike. These stereotypes form preconceived ideas about the areas of functioning both males and females will excel at without first understanding each individual's own personal strengths and weaknesses. The consequences of these stereotypical beliefs and overinflated gender differences have an effect on women's opportunities in the workplace and value in society, as well as on conflict and communication in families. They also contribute to low self-esteem among children, adolescents and adults (Hyde, 2005). Research on the issue of gender differences will likely help develop a greater awareness of the gender-biased expectations society places on children, adolescents and adults. A greater awareness will hopefully, in turn, begin to eliminate the gender stereotypes placed upon all of us.

As more research begins to support the gender-similarities hypothesis, (Hyde, 2005) society's ideas about the differences between males and females will change. This increased awareness of the prevalence of gender similarities will therefore lead to the elimination of false gender stereotypes within the classroom, therapeutic setting and home environment. As the idea of gender similarities becomes more widespread and accepted, teachers and parents will begin to eliminate their gender-biased expectations of their students and/or children.

Once this awareness becomes more widely accepted and disseminated through society, there will be more acceptance of males and females participating in fields previously deemed as gender specific. For example, it will be more accepted for females to be involved in mathematical, scientific and technical fields of study and work; conversely, it will be more accepted for males to be involved in fields of study and work that require more verbal and communication skills.

In addition to looking at gender differences, as well as the similarities between males and females in many areas of functioning, it will be important for future research to look at possible reasons for these differences. Are these gender differences a result of external factors in one's environment or are they truly a result of innate differences between males and females? Discovering the reasons for individuals' difficulties in certain areas of functioning, irrespective of gender, may prove useful in developing improved treatment and educational strategies.

References

Aalsma. M. C., & Lapsley, D. K. (2001). A typology of adolescent delinquency: Sex differences and implications for treatment. *Criminal Behavior and Mental Health, 11,* 173-191.

Achenbach, T. M. (1991). *Integrative guide for the 1991 CBCL/4-8, YSR, and TRF Profiles.* Burlington: University of Vermont Department of Psychiatry.

Achenbach, T. M. (1991). *Manual for the Youth Self-Report and 1991 profile.* Burlington: University of Vermont, Department of Psychiatry.

Achenbach, T. M., & Edelbrock, C. S. (1981). Behavioral problems and competencies reported by parents of normal and disturbed children aged 4 through 16. *Monographs of the Society for Research in Child Development, 46*(1), 1-82.

Achenbach, T. M., Howell, C. T., Quay, H. C., & Conners, C. K. (1991). National survey of problems and competencies among 4- to 16-year-olds: Parents reports for normative and clinical samples. *Monographs of the Society for Research in Child Development, 56*(3), 1-130.

Ackerman, P. T., Dykman, R. A., & Oglesby, D. M. (1983). Sex and group differences in reading and attention disordered children with and without hyperkinesis. *Journal of Learning Disabilities, 16,* 407-415.

Alexander, F., Allen, C., Brooks, J., Cole, C., & Campbell, A. (2004). Reason to believe: Representations of aggression as phenomenological read-out. *Sex Roles, 51,* 647–659.

Aronson, J., Lustina, M. J., Good, C., Keough, K., Steele, C. M., & Brown, J. (1999). When White men can't do math: Necessary and sufficient factors in stereotype threat. *Journal of Experimental Social Psychology, 35,* 29–46.

Aronson, J., Quinn, D. M., & Spencer, S. J. (1998). Stereotype threat and the academic underperformance of minorities and women. In J. K. Swim & C. Stangor Eds.), *Prejudice: The target's perspective* (pp. 83–103). San Diego, CA: Academic Press.

Asendorpf, J. B. (1990). Beyond social withdrawal; Shyness, unsociability and peer avoidance. *Human Development, 3,* 250-259.

Bebbington, P. E. (1996). The origins of sex differences in depressive disorder: Bridging the gap. *International Review of Psychiatry, 8*(4), 295-332.

Beck, A. T., & Steer, R. A. (1993). *Beck Anxiety Inventory: Manual.* San Antonio, TX: The Psychological Corporation.

Beck, A. T., Steer, R. A., Brown, G. K. (1996). *Beck Depression Inventory – Second Edition: Manual.* San Antonio, TX: The Psychological Corporation.

Becker, P., Grunwald, P., & Brazy, J. (1999). Motor organization in very low birth weight infants during caregiving: Effects of a developmental intervention. *Developmental and Behavioural Pediatrics, 20*(5), 344-354.

Beery, K. E, & Beery, N. A. (2004). *The Beery-Buktenica Developmental Test of Visual-Motor Integration – Fifth Edition: Administration, scoring, and teaching manual*. Minneapolis, MN: NCS Pearson.

Bem, S. L. (1983). Gender schema theory and its implications for child development: Raising gender-aschematic children in a gender-schematic society. *Signs, 8,* 598-616.

Benbow, C. P. (1988). Sex differences in mathematical-reasoning ability in intellectually talented preadolescents: Their nature, effects, and possible causes. *Behavioural and Brain Sciences, 11,* 169-232.

Beyer, S. (1990). Gender differences in the accuracy of self-evaluations of performance. *Journal of Personality and Social Psychology, 59,* 960-970.

Beyer, S. (1995). Maternal employment and children's academic achievement: Parenting style as mediating variable. *Developmental Review, 15,* 212-253.

Beyer, S., & Bowden, E. M. (1997). Gender differences in self-perceptions: Convergent evidence from three measures of accuracy and bias. *Personality and Social Psychology Bulletin, 23,* 157-172.

Bhanot, R., & Jovanovic, J. (2005). Do parents' academic gender stereotypes influence whether they intrude on their children's homework? *Sex Roles, 52,* 597-607.

Birenbaum, M., & Kraemer, R. (1995). Gender and ethnic-group differences in causal attributions for success and failure in mathematics and language examinations. *Journal of Cross-Cultural Psychology, 26,* 342-359.

Biederman, J., Faraone, S. V., Spencer, T., Wilens, T., Mick, E., & Lapey, K. A. (1994). Gender differences in a sample of adults with attention deficit disorder. *Psychiatry Research, 53,* 13-29.

Birenbaum, M., Kelly, A. E., & Levi-Keren, M. (1994). Stimulus features and sex differences in mental rotation test performance. *Intelligence, 19,* 51-64.

Blachman, D. R., & Hinshaw, S. P. (2002). Patterns of friendship among girls with and without attention-deficit/hyperactivity disorder. *Journal of Abnormal Child Psychology, 30,* 625-640.

Block, J., & Gjerde, P. F. (1990). Depressive symptoms in late adolescence: A longitudinal perspective on personality antecedents. In J. E. Rolfe, A Masten, D. Cicchetti, K. H. Neuchterlerin, & S. Weintraud (Eds.), *Risk and protective factors in the development of psychopathology* (pp. 334-360). Cambridge, England: Cambridge University Press.

Brannigan, G. G., & Decker, S. L. (2003). *Bender-Gestalt II: Examiner's manual.* Itasca, Il: Riverside Publishing.

Brody, N. (1992). *Intelligence* (2nd ed.). New York: Academic Press.

Bowen, F., Vitaro, F., Kerr, M., & Pelletier, D. (1995). Childhood internalizing problems: Prediction from kindergarten, effect of maternal overprotectiveness and sex differences. *Development and Psychopathology, 7,* 481-498.

Broberg, A. G., Ekeroth, K., Gustafsson, P. A., Hansson, K., Hägglöf, B., Ivarsson, T., & Larsson, B. (2001). Self-reported competencies and problems among Swedish adolescents: A normative study of the YSR. *European Child and Adolescent Psychiatry, 10,* 186–193.

Brooks-Gunn, J., & Peterson, A. C. (1991). Studying the emergence of depression and depressive symptoms during adolescence. *Journal of Youth and Adolescence, 20,* 115–119.

Broverman, D., Klaiber, E., Kobayashi, Y., & Vogel, W. (1968). Roles of activation and inhibition in sex differences in cognitive abilities. *Psychological Review, 75,* 23- 50.

Cairns, R. B., Cairns, B. D., Neckerman, H. J., Ferguson, L. L., & Gariepy, J. L. (1989). Growth and aggression: 1. Childhood to early adolescence. *Developmental Psychology, 25,* 320-330.

Campbell, A., & Muncer, S. (1987). Models of anger and aggression in the social talk of women and men. *Journal for the Theory of Social Behavior, 17,* 489-512.

Casey, M. B., Nuttall, R., Pezaris, E., & Benbow, C. P. (1995). The influence of spatial ability on gender differences in mathematical college entrance test scores across diverse samples. *Developmental Psychology, 31,* 697-705.

Carlo, G., Raffe, M., Laible, D., & Meyer, K. (1999). Why are girls less physically aggressive than boys? Personality and parenting mediators of physical aggression. *Sex Roles, 40,* 711-729.

Carlson, C. L., Shin, M., & Booth, J. (1999). The case for DSM-IV subtypes in ADHD. *Mental Retardation & Developmental Disabilities Research Reviews, 5,* 199-206.

Carlson, C. L., Tamm, L., & Gaub, M. (1997). Gender differences in children with ADHD, ODD, and co-occuring ADHD/ODD identified in a school population. *Journal of American Academy of Child and Adolescent Psychiatry, 36,* 1706-1714.

Calsyn, R. J., & Kenny, D. A. (1977). Self-concept of ability and perceived evaluation of others: Cause or effect of academic achievements? *Journal of Educational Psychology, 69,* 136-145.

Coie, J. D., & Dodge, K. A. (1998). The development of aggression and antisocial behaviour. In W. Damon (Editor-in-Chief) & N. Eisenberg (Vol. Ed.), *Handbook of Child Psychology: Vol. 4. Social, emotional, and personality development* (5th ed). New York: Wiley.

Coplan, R. J., Gavinski, M., Lagace, M. H., Seguin, D. G., & Wichmann, C. (2001). When girls versus boys play alone: Nonsocial play and adjustment in kindergarten. *Developmental Psychology, 37,* 464-474.

Coplan, R. J., Prakash, K., O'Neil, K., & Armer, M. (2004). Do you "want" to play? Distinguishing between conflicted shyness and social disinterest in early childhood. *Developmental Psychology, 40,* 244-255.

Coplan, R. J., & Rubin, K. H. (1998). Exploring and assessing nonsocial play in the preschool: The development and validation of the Preschool Play Behavior Scale. *Social Development, 7,* 72-91.

Convington, M. V. (1984). The motive for self-worth. In R. Ames & C. Ames (Eds.), *Research on motivation in education: Vol. 1. Students motivation* (pp. 78-113). Orlando, FL: Academic Press.

Crick, N. R., Ostrov, J. M., & Werner, N. E. (2006). A longitudinal study of relational aggression, physical aggression, and children's social-psychological adjustment. *Journal of Abnormal Child Psychology, 34*(2), 131-142.

Crick, N. R. (1996). The role of overt aggression, relational aggression, and prosocial behavior in children's social adjustment. *Child Development*, *33*, 610–617.

Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development*, *66*, 710–722.

Crick, N. R., Werner, N. E., Casas, J. F., O'Brien, K. M., Nelson, D. A., & Grotpeter, J. K. (1999). Childhood aggression and gender: A new look at an old problem. In D. Bernstein (Ed.), *Nebraska symposium on motivation*. Lincoln: The University of Nebraska Press.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52,* 281-302.

Cicchetti, D., & Rogosch, F. A. (1996). Equifinality and multifinality in developmental psychopathology. *Development and Psychopathology, 8,* 597-600.

DeFries, J. C, & Gillis, J. J. (1993). Genetics of reading disability. In Plomin, R. and McClearn, G. E. (Eds.), *Nature, nurture and psychology* (pp. 121-145). American Psychological Association: Washington, DC.

DeLisi, R., & Soundranayagam, L. (1990). The conceptual structure of sex role stereotypes in college students. *Sex Roles, 23*, 593-611.

Denckla, M., & Rudel, R. (1976). Naming of object drawings by dyslexic and other learning disabled children. *Brain and Language, 3,* 1-16.

Denno, D. (1982). Sex differences in cognition: A review and critique of the longitudinal evidence. *Adolescence, 17,* 779-788.

Diamantopoulou, S., Henricsson, L., & Rydell, A. (2005). ADHD symptoms and peer relations of children in a community sample: Examining associated problems, self-perceptions, and gender differences. *International Journal of Behavioral Development, 29,* 388-398.

Donahue, M. (1984). Learning disabled children's comprehension and production of syntactic devices for making given vs. new information. *Applied Psycholinguistics, 5,* 101-116.

Donahue, M., Pearl, R., & Brian, T. (1982). Learning disabled children's syntactic proficiency on a communicative task. *Journal of Speech and Hearing Disorders, 47,* 397-403.

Downing, J. (1977). How society creates reading disability. *The Elementary School Journal, 77,* 275-279.

Droege, R. C. (1967). Sex differences in aptitude maturation during high school. *Journal of Counselling Psychology, 14,* 407-411.

Eals, M., & Silverman, I. (1994). The hunter-gatherer theory of spatial sex differences: Proximate factors mediating the female advantage in recall of object arrays. *Ethnology and Sociobiology, 15,* 95-105.

Eagly, A. H. (1987). *Sex differences in social behaviour: A social role interpretation.* Hillsdale, NJ: Erlbaum.

Eagly, A. H., & Steffen, V. J. (1986). Gender and aggressive behaviour: A meta-analytic review of the social psychological literature. *Psychological Bulletin, 100,* 303-330.

Eno, L., & Woehlke, P. (1980). Diagnostics differences between handicapped and learning disabled students. *Psychology in the Schools, 17,* 469-473.

Entwisle, D. R., & Baker, D. B. (1983). Gender and young children's expectations for performance in arithmetic. *Developmental Psychology, 19,* 200-209.

Feingold, A. (1988). Cognitive gender differences are disappearing. *American Psychologist, 43,* 95-103.

Fennema, E. (1984). Girls, women, and mathematics. In E. Fennema & M. J. Ayer (Eds.), *Women and Education* (pp. 137–164). Berkely, CA: McCutchan.

Fennema, E., & Sherman, J. (1977). Sex-related differences in mathematics achievement, spatial visualization, and affective factors. *American Educational Research Journal, 14,* 51-71.

Ferree, M. M. (1990). Beyond separate spheres: Feminism and the family research. *Journal of Marriage and the Family, 52,* 866-884.

Finucci, J. M., & Childs, B. (1981). Are there really more dyslexic boys than girls? In A. Ansara, N. Geschwind, A. Galaburda, M. Alberta, & N. Gartrell (Eds.), *Sex differences in dyslexia* (pp. 1-10). Baltimore: Orton Dyslexia Society.

Fox, L. H., Brody, L., & Tobin, D. (1980). *Women and the mathematical mystique.* Baltimore, MD: Johns Hopkins University on Press.

Friedman, L. (1989). Mathematics and the gender gap: A meta-analysis of recent studies on sex differences in quantitative tasks. *Review of Educational Research, 59,* 185–213.

Fry, M. A., Johnson, C. S., & Muehl, S. (1970). Oral language production in relation to reading achievement among select second grader. In D. J. Baker & P. Satz

(Eds.), *Specific reading disability* (pp. 123-146). Netherlands: Rotterdam University Press.

Gabbard, C., Goncalves, V. M. G., & Santos, D. C. C. (2001). Visual-motor integration problems in low birth weight infants. *Journal of Clinical Psychology in Medical Settings, 8,* 199-204.

Gaub, M., & Carlson, C. L. (1997). Gender differences in ADHD: A meta-analysis and critical view. *Journal of American Academy of Child and Adolescent Psychiatry, 36,* 1036-1045.

Gay, L. R., & Airasian, P. (2003). *Educational research: Competencies for analysis and applications* (7th Ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Gazzaniga, M. S., Ivry, R. B., & Mangun, G. R. (1998). *Cognitive Neuroscience: The Biology of the Mind.* New York: W. W. Norton.

Gernigon, C., d'Arripe-Longueville, F., Debove, V., & Puvis, A. (2003). Situational indexes of achievement motivation. Help-seeking and performance: Influences of the learning context and gender differences. *Research Quarterly for Exercise and Sport, 74,* 473-479.

Gershon, J. (2002a). A meta-analysis review of gender differences in ADHD. *Journal of Attention Disorder, 5,* 143-154.

Gershon, J. (2002b). Gender differences in ADHD. *ADHD Report, 10,* 14-16.

Glasgow, K. L., Dornbusch, S. M., Troyer, L., Steinberg, L., & Ritter, P. L. (1997). Parenting styles, adolescents' attributions, and educational outcomes in nine heterogeneous high schools. *Child Development, 68,* 507-529.

Graetz, B. W., Sawyer, M. G., Hazell, P., Arney, F., & Baghurst, P. (2001). Validity of DSM-IV ADHD subtype in a nationally representative sample of Australian children and adolescents. *Journal of American Academy of Child and Adolescent Psychiatry, 40,* 1410-1417.

Green, M. T., & Clopton, J. R. (1996). Understanding gender differences in referral of children to mental health services. *Journal of Emotional and Behavioral Disorders, 4*(3), 182-190.

Gilbert, M. C. (1996). Attributional patterns and perceptions of math and science among fifth-grade through seventh-grade girls and boys. *Sex Roles, 35,* 489 506.

Ginzburg, H., & Opper, S. (1979). *Piaget's theory of intellectual development.* Englewood Cliffs, NJ: Prentice-Hall.

Good, C., Aronson, J., & Inzlicht, M. (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Applied Developmental Psychology, 24,* 645–662.

Halpern, D. F. (1992). *Sex difference in cognitive abilities* (2nd ed.). Hillsdale, HJ: Elbaum.

Halpern, D. F. (1996). A process-oriented model of cognitive sex differences. *Learning and Individual Differences, 8,* 3-24.

Halpren, D. F., & LaMay, M. L. (2000). The smarter sex: A critical review of sex differences in intelligence. *Educational Psychology Review, 12*(2), 229-246.

Hankin, B. L., & Abramson, L. Y. (1999). Development of gender differences in depression: Description and possible explanations. *Annals of Medicine, 31,* 372-379.

Hare-Mustin, R. T., & Marecek, J. (1994). Asking the right questions: Feminist psychology and sex differences. *Feminism and Psychology, 4,* 531-537.

Hedges, L. V., & Nowell, A. (1995). Trends in gender differences in academic achievement from 1960 to 1994: An analysis of gender differences in mean variance, and extreme scores. *Sex Roles, 39,* 21-43.

Hedges, L. V., & Nowell, A. (1995). Sex differences in mental-test scores, variability, and numbers of high-scoring individuals. *Science, 269,* 41-45.

Helmke, A. & van Aken, A. G. (1995). The causal ordering of academic achievement and self-concept of ability during elementary school: A longitudinal study. *Journal of Educational Psychology, 37*(4), 624-637.

Henning-Stout, M., & Close-Conoley, J. (1992). Gender: A subtle influence in the culture of the school. In F. J. Medway & T. P. Cafferty (Eds.), *School Psychology: A Social Psychological Perspective* (pp. 113-135). Hillsdale, NJ: Erlbaum.

Henslin, J., & Nelson, A. (1996). *Sociology: A down-to-earth approach.* Scarborough, ON: Allyn & Bacon.

Herlitz, A., & Nilsson, L. G. (1998). Gender differences in episodic memory. *Memory & Cognition, 25,* 801-811.

Hewitt, P. L., & Norton, G. N. (1993). The Beck Anxiety Inventory: A psychometric analysis. *Psychological Assessment, 5,* 408-412.

Hilton, T. L, & Berglund, S. W. (1974). Sex differences in mathematics achievement: A longitudinal study. *Journal of Educational Research, 67,* 231-237.

Hollway, W. (1994). Beyond sex differences: A project for feminist psychology. *Feminism & Psychology, 4,* 538-546.

Huttenlocher, J., Haight, W., Bryk, A., Seltzer, M., & Lyons, T. (1991). Early vocabulary growth: Relation to language input and gender. *Developmental Psychology, 27,* 236-248.

Hyde, J. S. (1984). How large are gender differences in aggression? A developmental meta-analysis. *Developmental Psychology, 20,* 722-736.

Hyde, J. S. (1990). Meta-analysis and the psychology of gender differences. *Signs: Journal of Women in Culture and Society, 16,* 55-73.

Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist, 60,* 581-592.

Hyde, J. S., Fennema, E., & Lamon, S. J. (1990). Gender differences in mathematics performance: A meta-analysis. *Psychological Bulletin, 107,* 139–155.

Hyde, J. S., Fennema, E., Ryan, M., Frost, L. A., & Hopp, C. (1990). Gender comparisons of mathematics attitudes and affect. *Psychology of Women Quarterly, 14,* 299-324.

Hyde, J. S., & Linn, M. C. (1988). Gender differences in mathematics performance: A meta-analysis. *Psychological Bulletin, 104,* 53-69.

Hutton, J. B. (1984). Teacher ratings of problem behaviors: Which student behaviors "concern" and "disturb" teachers? *Psychology in the Schools, 21,* 482-484.

Jastak, J. & Jastak, J. (1978). *The Wide Range Achievement Test.* Wilmington, DE: Jastak Associates.

Jenson, P. S., Watanabe, H. K., Richters, J. E., Cortes, R., Roper, M., & Liu, S. (1995). Prevalence of mental disorder in military children and adolescents: Findings from a two-stage community survey. *Journal of American Academy of Child and Adolescent Psychiatry, 36,* 737-744.

Jones, L. V. (1984). White-Black achievement differences: The narrowing gap. *American Psychologist, 39,* 1207-13.

Jones, M. G. (1989). Gender bias in classroom interactions. *Contemporary Education, 60,* 218-222.

Kaufman, A. S., Reynolds, C. R., & MacLean, J. E. (1989). Age and WAIS-R intelligence in a national sample of adults in the 20- to 74-year age range: A cross-sectional analysis with educational level controlled. *Intelligence, 3,* 235-253.

Keenan, K., & Shaw, D. (1997). Developmental and social influences on young girls' early problem behavior. *Psychological Bulletin, 121,* 95-113.

Kendler, K., & Prescott, C. (1999). A population based twin study of lifetime major depression in men and women. *Archives of General Psychiatry, 56,* 39-44.

Keogh, B., & Smith, C. (1968). Changes in copying ability of young children. *Perceptual Motor Skills, 26,* 773-774.

Kerns, K. A., & Berenbaum, S. A. (1991). Sex differences in spatial ability in children. *Behaviour Genetics, 21,* 383-396.

Kessler, R., McGongale, K., Zhao, S., Nelson, C. B., Huges, N., Eshleman, S., Wittchen, H.U., & Kendler, K. S. (1994). Life-time and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. *Archives of General Psychiatry, 51,* 8-19.

Kimball, M. M. (1989). A new perspective on women's math achievement. *Psychological Bulletin, 105,* 198–214.

Kholberg, L. (1966). A cognitive-developmental analysis of children's sex role concepts and attitudes. In M. Maccoby (Ed.), *The Developmental of Sex Differences* (pp. 82-172). Standford, CA: Standford University.

Kochanska, G. (1991). Patterns of inhibition to the unfamiliar in children of normal and affectively ill mothers. *Child Development, 62,* 250-263.

Koppitz, E. (1975). *The Bender Gestalt test for young children Vol. II.* New York: Grune & Stratton.

Lambert, M. C., Weisz, J. R., & Knight, F. (1989). Over- and undercontrolled clinic referral problems of Jamaican and American children and adolescents: The culture general and the culture specific. *Journal of Consulting and Clinical Psychology, 57,* 467-472.

Larrabee, G. J., & Crook, T. H., III. (1993). Do men show more rapid age-associated decline in simulated everyday verbal memory than do women? *Psychology and Aging, 8,* 68-71.

Lawson, J., & Inglis, J. (1984). The psychometric assessment of children with learning disabilities: An index derived from a principal components analysis of the WISC-R. *Journal of Learning Disabilities, 17,* 517-522.

Leadbeater, B. J., Kuperminc, G. P., Blatt, S., & Hertzog, C. (1999). A multivariate model of gender differences in adolescents' internalizing and externalizing problems. *Developmental Psychology, 35*, 1268–1282.

Lee, D., & Hertzberg, J. (1978). Theories of feminine personality. In I. E. Frieze, J. E. Parsons, P. B. Johnson, D. N. Ruble, & G. L. Zellman (Eds.), *Women and Sex Roles: A Social Psychological Perspective* (pp. 28-44). New York: W. W. Norton.

Leon, M. R., & Revelle, W. (1985). The effects of anxiety on analogical reasoning: A test of three theoretical models. *Journal of Personality and Social Psychology, 49,* 1302-1315.

Levine, M., & Fuller, G. (1972). Sex differences on psychoeducational tests with three classified deficit reading groups. *Slow Learning Child, 19,* 165-174.

Levy, F., David, H. A., Bennett, K. S., & Michael, M. (2005). Gender differences in ADHD subtype comorbidity. *Journal of American Academic Child and Adolescent Psychiatry, 44*, 368-376.

Lewinsohn, P. M., Hops, H., Roberts, R. E., Seeley, J. R., & Andrews, J. A. (1993). Adolescent psychopathology: I. Prevalence and incidence of depression and other DSM-III-R disorders in high school students. *Journal of Abnormal Psychology, 102,* 133-144.

Lindesmith, A. R., & Strauss, A. L. (1968). *Social Psychology* (4th ed.). New York: Holt, Rinehart and Winston.

Lindley, H. A., & Keithley, M. E. (1991). Gender expectations and student achievement. *Roeper Review, 13,* 213-215.

Lindsay, L. L. (1994). *Gender roles: A sociological perspective* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.

Loring-Meier, S., & Halpern, D. F. (1999). Sex differences in visual-spatial working memory: Components of cognitive processing. *Psychonomic Bulletin Review, 6,* 464-471.

Maccoby, E., & Jacklin, C. (1974). *The psychology of sex differences.* Standford, CA: Standford University Press.

MacLeod, C., & Donnellan, A. M. (1993). Individual differences in anxiety and the restriction of working memory capacity. *Personality and Individual Differences, 15,* 163-173.

Majeres, R. (1977). Sex differences in clerical speed: Perceptual encoding vs. verbal encoding. *Memory and Cognition, 5,* 468- 476.

Makintosh, N. J. (1996). Sex differences in IQ. *Journal of Biosocial Science, 28,* 559-571.

Masten, A. S., & Roisman, G. I. (2005). Developmental cascades: Linking academic achievement and externalizing and internalizing problems over 20 years. *Developmental Psychology, 41,* 733-746.

McGee, M. G. (1979). Human spatial abilities: Psychometric studies and environmental, genetic, hormonal and neurological influences. *Psychological Bulletin, 86,* 889-918.

McGrew, K. S., & Woodcock, R. W. (2001). *Woodcock-Johnson III: Technical Manual.* Itasca, IL: Riverside Publishing.

McGuinness, D. (1985). *When children don't learn: Understanding the biology and psychology of learning disabilities.* New York: Basic Books.

McGuinness, D. (1976). Sex differences in the organization of perception and cognition. In B. Lloyd, & J. Archer (Eds.), *Exploring Sex Differences* (pp. 123-156). New York: Academic Press.

McGuinness, D. (1993). Sex differences in cognitive style: Implications for mathematics performance and achievement. In L.A. Penner, G. M. Batsche, H. M. Knoff, & D. L. Nelson (Eds.), *The challenge of mathematics and science education: Psychology's response* (pp. 251-274). Washington, DC: American Psychological Association.

McNeilly-Choque, M., Hart, C. H., Robinson, C. C., Nelson, L. J., & Olsen, S. F. (1996). Overt and relational aggression on the playground: Correspondence among different informants. *Journal of Research in Childhood Education, 11,* 47–67.

Meinz, E. J., & Salthouse, T. A. (1998). Is age kinder to females than to males? *Psychonomic Bulletin Review, 5,* 56-70.

Miller, H., & Bichsel, J. (2003). Anxiety, working memory, gender, and math performance. *Personality and Individual Differences, 37,* 591-606.

Mills, C. J., Ablard, K. E., & Strump, H. (1993). Gender differences in academically talented young students' mathematical reasoning: Patterns across age and subskills. *Journal of Educational Psychology, 85,* 340-346.

Mook, D. G. (2001). *Psychological research: The ideas behind the methods.* New York: W. W. Norton & Company.

Nelson, E. D., & Robinson, B. W. (1999). *Gender in Canada.* Scarborough, Ontario: Prentice-Hall Canada Inc.

Ninio, A., & Liebich, A. (1976). The grammar of action "phase structure" in children's copying. *Child Development, 47,* 846-849.

Nolan, E. E., Volpe, R. J., Gadow, K. D., & Sprafkin, J. (1999). Developmental, gender and comorbidity differences in clinic referred children with ADHD. *Journal of Emotional and Behavioural Disorders, 7,* 11-21.

Nolen-Hoeksema, S. (1990). *Sex differences in depression.* Standford, CA: Standford University Press.

Nolen-Hoeksema, S., & Girgus, J. S. (1994). The emergence of gender differences in depression during adolescence. *Psychological Bulletin, 115,* 424-443.

Ochoa, L., Becker, A. T., & Steer, R. A. (1992). Gender differences in comorbid anxiety and mood disorders. *American Journal of Psychiatry, 149,* 1409-1410.

Offord, D. R., Adler, R. J. M., & Boyle, M. H. (1986). Prevalence and sociodemographic correlates of conduct disorder. *American Journal of Social Psychiatry, 6,* 272-278.

Offord, D. R., Boyle, M. H., & Racine, Y. A. (1991). The epidemiological and antisocial behaviour in childhood and adolescence. In D. J. Pepler & K. H. Rubin (Eds.), *The development and treatment of childhood aggression* (pp. 862-870). Hillsdale, NJ: Erlbaum.

Ostrov, J. M., & Keating, C. F. (2004). Gender differences in preschool aggression during free play and structured interactions: An observational study. *Social Development*, *13*, 255–277.

Parsons, J. E., Adler, T. F., & Kaczala, C. M. (1982). Socialization of achievement attitudes and beliefs: Parental influences. *Child Development, 53,* 310-321.

Pearcy, M. T., Clopton, J. R., & Pope, A. W. (1993). Influences on teacher referral of children to mental health services: Gender, severity, and internalizing versus externalizing problems. *Journal of Emotional and Behavioral Disorders, 1,* 165-169.

Petersen, A. C., Compas, B. R., Brooks-Gunn, J., Stemmler, M., Ey, S., & Grant, K. E. (1993). Depression in adolescence. *American Psychologist, 48,* 155-168.

Ramsey, F. L., & Shafer, D. W. (1997). *The Statistical Sleuth: A course in methods of data analysis.* Belmont, CA: Wadsworth Publishing Company.

Reynolds, C. R., & Kamphaus, R. W. (1992). *Behaviour Assessment System for Children: Manual.* Circle Pines, MN: American Guidance Service.

Reynolds, C. R., & Kamphaus, R. W. (2004). *Behaviour Assessment System for Children – Second Edition: Manual.* Circle Pines, MN: American Guidance Service.

Robinson, N. M., Abbott, R. D., Berninger, V. W., & Busse, J. (1996). The structure of abilities in math-precocious young children: Gender similarities and differences. *Journal of Educational Psychology*, *88*, 341-352.

Roid, G. H. (2003). *Stanford–Binet Intelligence Scales – Fifth Edition: Technical Manual.* Itasca, IL: Riverside Publishing.

Rosenfield, D., & Stephan, W. G. (1978). Sex-differences in attributions for sex-typed tasks. *Journal of Personality, 46,* 244-259.

Rubin, K. H., & Asendorpf, J. B. (1993). Serial withdrawal, inhibition, and shyness in childhood: Conceptual and definitional issues. In K. H. Rubin & J. B. Asendorpf (Eds.), *Social withdrawal, inhibition, and shyness in childhood* (pp. 3-17). Hillsdale, NJ: Lawrence Erlbaum Associates Inc.

Rudolph, K. D., & Hammen, C. (1999). Age and gender as determinants of stress exposure, generation, and reactions in youngsters: A transactional perspective. *Child Development*, *70*, 660–677.

Rutter, M. (1990). Psychosocial resilience and protective mechanisms. In J. E. Rolf, A. Masten, D. Cicchetti, K. H. Neuchterlein, & S. Weintraub (Eds.), *Risk and protective factors in the development of psychopathology* (pp. 181-214). Cambridge, England: Cambridge University Press.

Ryckman, D. (1981). Sex differences in a sample of learning disabled children. *Learning Disability Quarterly, 4,* 48-52.

Sherman, J. A. (1978). *Sex-related cognitive differences*. Springfield, IL: Thomas.

Spencer, S., Steele, C. M., & Quinn, D. M. (1999). Stereotype threat and women's math performance. *Journal of Experimental Social Psychology, 35,* 4–28.

Shalev, R. S., & Gross-Tsur, V. (2001). Developmental Dyscalculia. *Pediatric Neurology, 24,* 337-342.

Shucard, D. W., Shucard, J. L., & Thomas, D. G. (1987). Sex differences in electrophysiological activity in infancy: Possible implications for language development. In S. U. Phillips, S. Steele, & C. Tanz, (Eds.), *Language, Gender, and Sex in Comparative Perspective* (pp. 278-295). Cambridge University Press: Cambridge.

Smolak, L. (1986). *Infancy,* Prentice-Hall, Englewood Cliffs, NJ.

Sorg, B. A., & Whitney, P. (1992). The effect of trait anxiety and situational stress on working memory capacity. *Journal of Research in Personality, 26,* 235-241.

Sprock, J., & Yoder, C. Y. (1997). Women and depression: An update on the report of the APA task force. *Sex Roles, 36,* 269-303.

Stanley, J. C. (1994). Gender differences for able elementary school students on above grade-level ability and achievement tests. In N. Colangelo, S. G. Assouline & D. L. Ambroson (Eds.), *Talent development: Vol. 2. Proceedings from the 1993 Henry B. and Jocelyn Wallace National Research Symposium on Talent Development* (pp. 141-148). Vandalia, OH: Ohio Psychology Press.

Stanley, J. C, Benbow, C. P., Brody, L. E., Dauber, S., & Lupkowski, A. (1992). Gender differences in eighty-six nationally standardized aptitude and achievement tests. In N. Colangelo, S. G. Assouline, & D. L. Ambroson (Eds.), *Talent Development: Vol. 1. Proceedings from the 1991 Henry B. and Jocelyn Wallace National Research Symposium on Talent Development* (pp. 42-65). Unionville, NY: Trillium Press.

Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist, 52,* 613–629.

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African-Americans. *Journal of Personality and Social Psychology, 69,* 797–811.

Steele, C. M., Spencer, S., & Aronson, J. (2002). Contending with group image: The psychology of stereotype and social identity threat. In M. Zanna (Ed.), *Advances in experimental social psychology* (pp. 379–440). San Diego, CA: Academic Press.

Stewart, S. H., Taylor, S., & Baker, J. M. (1997). Gender differences in the dimensions of anxiety sensitivity. *Journal of Anxiety Disorders, 11,* 179-200.

Strumpf, H. (1995). Gender differences in performance on tests of cognitive abilities: Experimental design issues and empirical results. *Learning and Individual Differences, 7,* 275-288.

Tarnowski, K. J., Anderson, D. F., Drabman, R. S, & Kelly, P. A. (1990). Disproportionate referrals for child academic/behavior problems: Replication and extension. *Journal of Consulting and Clinical Psychology, 58,* 240-243.

Thijs, J. T., Koomen, H. M. Y., de Jong, P. F., van der Leij, A., & van Leeuwen, M. G. P. (2004). Internalizing behaviors among kindergarten children: Measuring dimensions of social withdrawal with a checklist. *Journal of Clinical Child and Adolescent Psychology, 33*(4), 802-812.

Thurber, J. R., Heller, T. L., & Hinshaw, S. P. (2002). The social behaviors and peer expectations of girls with attention deficit hyperactivity disorder and comparison girls. *Journal of Clinical Child and Adolescent Psychology, 31,* 443-452.

Tittemore, J., Lawson, J., & Inglis, J. (1985). Validation of a learning disability index derived from a principal components analysis of the WISC-R. *Journal of Leaning Disabilities, 18,* 449-454.

The Psychological Corporation (2002). *Wechsler Individual Achievement Test – Second Edition: Manual.* San Antonio, TX: Author.

Thompson, L. (1993). Conceptualizing gender in marriage: The case of marital care. *Journal of Marriage and the Family, 55,* 557-569.

Trafton, R., & Garrison, W. (1982). *Male-female differences in cognitive abilities in various age groups (Tech. Rep. 1982-83).* Boston: Johnson O'Connor Research Foundation.

U. S. Department of Education. (1997). *National Assessment of Educational Progress (Indicator 32: Writing proficiency: Prepared by the Educational Testing Service).* Washington, DC. (World Wide Web: http//www.ed/gov/nces)

Vance, H., Singer, M., & Engin, A. (1980). WISC-R subtest differences for male and female children and youth. *Journal of Clinical Psychology, 36,* 953-957.

Vogel, S. A. (2001). Gender differences in intelligence, language, visual-motor abilities, and academic achievement in students with learning disabilities: A Review of the Literature. *Journal of Learning Disabilities, 23*(1), 44-52.

Vogel, S. A. (1975). *Syntactic abilities in normal and dyslexic children.* Baltimore: University Park Press.

Vogel, S. A. (1977). Morphological ability in good and poor readers. *Journal of Learning Disabilities, 10,* 35-43.

Vogel, S. A. (1983). A qualitative analysis of performance on a measure of morphology in learning disabled and achieving children. *Journal of Learning Disabilities, 16,* 416-420.

Vogel, S. A., & Mc Grady, H. J. (1975). Recognition of melody pattern in good and poor readers. *Elementary English, 52,* 414-418.

Vogel, S. A., & Walsh, P. (1987). Gender differences in cognitive abilities in learning disabled females and males. *Annals of Dyslexia, 37,* 142-165.

Volling, B. L., MacKinnon L. C., Rabiner, D., & Baradaran, L. P. (1993). Children's social competence and sociometric status: Further exploration of aggression, social withdrawal, and peer rejection. *Development and Psychopathology, 5,* 459-483.

Voyer, D., Voyer, S., & Bryden, M. P. (1995). Magnitude of sex differences in spatial abilities: A meta-analysis and consideration of critical variables. *Psychological Bulletin, 117,* 250-270.

Waber, D. P. (1976). Sex differences in mental abilities: A function of maturation rate? *Science, 192,* 572-574.

Waber, D. P. (1979). Sex differences in mental abilities, hemispheric lateralization and rate of physical growth at adolescence. *Developmental Psychology, 13,* 29-38.

Waber, D. P., & Homes, J. M. (1985). Assessing children's copy productions of the Rey Osterrieth complex figure. *Journal of Clinical and Experimental Neuropsychology, 7,* 264-280.

Waber, D. P., & Homes, J. M. (1986). Assessing children's memory productions of the Rey-Osterrieth complex figure. *Journal of Clinical and Experimental Neuropsychology, 8,* 563-580.

Walker, E., Bettes, B., & Ceci, S. (1984). Teachers' assumptions regarding the severity, causes, and outcomes of behavioral problems in preschoolers: Implications for referral. *Journal of Consulting and Clinical Psychology, 52,* 899-902.

Warren, M., & Rosenbaum, J. L. (1986). Criminal careers of female offenders. *Criminal Justice and Behavior, 13,* 393-418.

Wechsler, D. (2003). *Wechsler Intelligence Scale for Children – Fourth Edition: Canadian technical manual.* Toronto, Ontario, Canada: The Psychological Corporation.

Wechsler, D. (2001). *Wechsler Adult Intelligence Scale – Third Edition: Canadian technical manual.* Toronto, Ontario, Canada: The Psychological Corporation.

Wigg, E. H., & Semel, E. M. (1976). *Language disabilities in children and adolescents.* Columbus, OH: Merrill.

Wigg, E. H., & Semel, E. M. (1984). *Language assessment and intervention.* Columbus, OH: Merrill.

Wilkinson, G. S. (1993). *The Wide Range Achievement Test – Third Edition: Technical manual.* Wilmington, Delaware: Wide Range, Inc.

Wilson, E. O. (1978). *On Human Nature.* Cambridge, MA: Harvard University Press.

Wolf, M. (1981). The word-retrieval process and reading in children and aphasics. In K. Nelson (Ed.), *Children's language* (pp. 437-493) New York: Gardner Press.

Wolk, S. I., & Weissman, M. M. (1995). Women and depression: An update. *American Psychiatry Press Review, 14,* 401-412.

Younes, R., Rossner, B., & Wedd, G. (1983). Neurological immaturity of learning disabled children. *Developmental Medicine and Child Neurology, 25,* 574-579.

Appendix A

Description of the WIAT-II Composites and Subtests

Composite	Subtest	Description
Reading	Word Reading	Assesses pre-reading (phonological awareness) and decoding skills.
	Reading Comprehension	Reflects reading instructions in the classroom
	Pseudoword Decoding	Measures the ability to apply phonetic decoding skills.
Mathematics	Numerical Operation	Evaluates the ability to identify and write numbers
	Math Reasoning	Assesses the ability to reason mathematically.
Written Language	Spelling	Evaluates the ability to spell
	Written Expression	Measures the ability to write at all language levels.
Oral Language	Listening Comprehension	Measures the ability to listen to details.
	Oral Expression	Reflects a broad ranged of oral language activities.

Appendix B

Description of the WJ-III Subtests

Subtest	Description
Letter-word Identification	Assesses word identification abilities, which includes the pronunciation of words without having to understand the meaning of the word.
Reading Fluency	Assesses the ability to read simple sentences quickly and decide if the statement is *True* or *False*.
Calculation	Assesses the ability to perform mathematical computations, including addition, subtraction, multiplication, division, and a combination of these operations, as well as geometric, trigonometric, logarithmic and calculus operations.
Math Fluency	Assesses the ability to solve simple addition, subtraction, and multiplication facts quickly.
Spelling	Assesses the ability to write orally presented words correctly, beginning with the drawing lines and tracing letters to being able to spell words correctly.
Writing Fluency	Assesses the ability to formulate and write sentences quickly.
Passage Comprehension	Assesses symbolic learning (the ability to match a pictographic representation of a word with an actual picture of an object).
Applied Problems	Assesses the ability to analyze and solve math problems. In order to solve these problems, the individual must listen to the problem, recognize the procedure to be followed and then perform the appropriate calculation.
Writing Samples	Assesses the ability to write responses to a variety of demands and quality of written expression.
Word Attack	Assesses the ability to apply phonetic and structural analysis to the pronunciation of unfamiliar printed words.
Picture Vocabulary	Assesses oral language development and lexical (word) knowledge as well as the ability to identify pictured objects.
Broad Reading	Provides a comprehensive measure of reading achievement, including decoding, reading speed and the ability to comprehend connected discourse while reading.
Broad Math	Provides a comprehensive measure of math achievement, including problem solving, number facility, automaticity and reasoning.
Broad Written Language	Provides a comprehensive measure of written language achievement, including the spelling of single-word responses, fluency in production and quality of expression.
Total Achievement	Represents overall performance level across the various achievement domains.

Appendix C

Description of the BASC TRS and PRS Scale Definitions

Scale	Definition
Adaptability	The ability to adapt readily to changes in the environment
Anxiety	The tendency to be nervous, fearful, or worried about real or imagined problems
Aggression	The tendency to act in a hostile manner (either verbally or physically) that is threatening to others
Attention Problems	The tendency to be easily distracted and unable to concentrate more than momentarily
Atypicality	The tendency to behave in ways that are immature, considered "odd" or commonly associated with psychosis (such as experiencing visual or auditory hallucinations).
Conduct Problems	The tendency to engage in antisocial and rule-breaking behaviour, including destroying property
Depression	Feelings of unhappiness, sadness, and stress that may result in an inability to carry out everyday activities (neurovegetative symptoms) or may bring on thoughts of suicide
Hyperactivity	The tendency to be overactive, rush through work or activities, and act without thinking
Learning	The skills associated with accomplishing academic, social, or community goals, including the ability to work with others
Learning Problems	The presence of academic difficulties, particularly understanding or completing homework
Social Skills	The skills necessary for interacting successfully with peers and adults in home, school, and community settings
Somatization	The tendency to be overly sensitive to and complain about relatively minor physical problems and discomforts
Study Skills	The skills that are conducive to strong academic performance, including organization skills and good study habits
Withdrawal	The tendency to evade others to avoid social contact
Adaptability	The ability to adjust to changes in routine and new teachers, to shift from one task to another, and to share toys or possessions with others
Social Skills	The interpersonal aspects of social adaptation, including good manners
Study Skills	Achievement motivation and organizational skills
Externalizing Problems	The tendency to display disruptive-behaviour problems such as aggression, hyperactivity, and delinquency ("under controlled" behaviour)
Internalizing Problems	The tendency to monitor one's actions to excess and to be compliant, sometimes with problems going unnoticed ("over controlled" behaviour)
School Problems	Reflects academic difficulties, including problems of motivation, attention, and learning and cognition
Adaptive Skills	Summarizes prosocial, organizational, study and other adaptive skills
Behavioural Symptoms Index	Measures overall level of problem behaviour

Description of the BASC SRP Scale Definitions

Scale	Definition
Anxiety	Feelings of nervousness, worry, and fear; the tendency to be overwhelmed by problems
Attitude to School	Feelings of alienation, hostility, and dissatisfaction regarding school
Attitude to Teachers	Feelings of resentment and dislike of teachers; beliefs that teachers are unfair, uncaring, or overly demanding
Atypicality	The tendency towards gross mood swings, bizarre thoughts, subjective experiences, or obsessive-compulsive thoughts and behaviours often considered "odd"
Depression	Feelings of unhappiness, sadness, and dejection; a belief that nothing goes right
Interpersonal Relations	The perception of having a good social relationships and friendships with peers
Locus of Control	The belief that rewards and punishments are controlled by external events or people
Relations with Parents	A positive regard towards parents and a feeling of being esteemed by them
Self-Esteem	Feelings of self-esteem, self-respect, and self-acceptance
Self-Reliance	Confidence in one's ability to solve problems; a belief in one's personal dependability and decisiveness
Sensation Seeking	The tendency to take risks, to like noise and to seek excitement
Sense of Inadequacy	Perceptions of being unsuccessful in school, unable to achieve one's goals, and generally inadequate
Social Stress	Feelings of stress and tension in personal relationships; a feeling of being excluded from social activities
Somatization	The tendency to be overly sensitive to, to experience, or to complain about relatively minor physical problems and discomforts
Clinical Maladjustment	Indicates the presence of substantial problems
School Maladjustment	Broad measure of adaptation to school
Personal Adjustment	Indicates the level of positive adjustment; problems with interpersonal relationships, self-acceptance, identify development, and ego strength
Emotional Symptoms Index	Global indicator of serious emotional disturbance

Description of the BASC-2 TRS and PRS Scale Definitions

Scale	Definition
Activities of Daily Living	The skills associated with performing basic, everyday tasks in an acceptable and safe manner
Adaptability	The ability to adapt readily to changed in the environment
Aggression	The tendency to act in a hostile manner (either verbally or physically) that is threatening to others
Anxiety	The tendency to be nervous, fearful, or worried about real or imagined problems
Attention Problems	The tendency to be easily distracted and unable to concentrate more than momentarily
Atypicality	The tendency to behave in ways that are considered "odd" or commonly associated with psychosis
Conduct Problems	The tendency to engage in antisocial and rule-breaking behaviour, including destroying property
Depression	Feelings of unhappiness, sadness, and stress that may result in an inability to carry out everyday activities or may bring on thoughts of suicide
Functional Communication	The ability to express ideas and communicate in a way others can easily understand
Hyperactivity	The tendency to be overactive, rush through work or activities, and act without thinking
Leadership	The skills associated with accomplishing academic, social, or community goals, including the ability to work with others
Learning Problems	The presence of academic difficulties, particularly understanding or completing homework
Social Skills	The skills necessary for interacting successfully with peers and adults in home, school, and community settings
Somatization	The tendency to be overly sensitive to and complain about relatively minor physical problems and discomforts
Study Skills	The skills that are conducive to strong academic performance, including organization skills and good study habits
Withdrawal	The tendency to evade others to avoid social contact
Externalizing Problems	The tendency to display disruptive-behaviour problems such as aggression, hyperactivity, and delinquency ("under controlled" behaviour)
Internalizing Problems	The tendency to monitor one's actions to excess and to be compliant, sometimes with problems going unnoticed ("over controlled" behaviour)
School Problems	Reflects academic difficulties, including problems of motivation, attention, and learning and cognition
Behavioural Symptoms Index	Reflects appropriate emotional expression and control, daily-living skills inside and outside the home, and communication skills, as well as prosocial, organizational, study skills
Adaptive Skills	Reflects the overall level of problem behaviour; the general level of functioning or presence of impairment for an individual with a disability or diagnosed condition
Executive Functioning	Reflects the ability to plan, anticipate, inhibit or maintain goal-directed activity

Description of the BASC-2 SRP Scale Definitions

Scale	Definition
Alcohol Abuse	The tendency to use alcohol to feel better to calm down and to experience adverse outcomes as a result of alcohol use
Anxiety	Feelings of nervousness, worry, and fear; the tendency to be overwhelmed by problems
Attention Problems	The tendency to report being easily distracted and unable to concentrate more than momentarily
Attitude to School	Feelings of alienation, hostility, and dissatisfaction regarding school
Attitude to Teachers	Feelings of resentment and dislike of teachers; beliefs that teachers are unfair, uncaring, or overly demanding
Atypicality	The tendency towards bizarre thoughts or other thoughts and behaviours considered "odd"
Depression	Feelings of unhappiness, sadness, and dejection; a belief that nothing goes right
Hyperactivity	The tendency to report being overly active, rushing through work or activities, and acting without thinking
Interpersonal Relations	The perception of having a good social relationships and friendships with peers
Locus of Control	The belief that rewards and punishments are controlled by external events or people
Relations with Parents	A positive regard towards parents and a feeling of being esteemed by them
School Maladjustment	Perceived difficulties associated with attending postsecondary institutions, including feeling overwhelmed, unmotivated, and forced to attend school
Self-Esteem	Feelings of self-esteem, self-respect, and self-acceptance
Self-Reliance	Confidence in one's ability to solve problems; a belief in one's personal dependability and decisiveness
Sensation Seeking	The tendency to take risks and to seek excitement
Sense of Inadequacy	Perceptions of being unsuccessful in school, unable to achieve one's goals, and generally inadequate
Social Stress	Feelings of stress and tension in personal relationships; a feeling of being excluded from social activities
Somatization	The tendency to be overly sensitive to, to experience, or to complain about relatively minor physical problems and discomforts

Appendix D

Summary of the Results Among the Adult Sample for all Variables Assessed Using ANOVA

Assessment Measure	Variable	Mean Female Score	Mean Male Score	Female Standard Deviation	Male Standard Deviation	Significant Gender Difference
SBV	Full Scale IQ	103.00	101.22	15.780	14.805	No
	Verbal IQ	83.80	97.22	43.580	22.326	No
	Nonverbal IQ	101.80	102.44	15.073	17.458	No
	Fluid Reasoning	107.00	100.44	17.029	14.319	No
	Knowledge	103.80	98.11	15.928	13.195	No
	Quantitative Reasoning	102.00	104.78	16.613	13.782	No
	Visual Spatial Processing	103.20	110.89	14.429	14.339	No
	Working Memory	98.00	96.89	11.747	7.590	No
WAIS-III	Full Scale IQ	94.62	99.46	14.731	14.475	No
	Performance IQ	98.20	99.38	14.990	13.202	No
	Verbal IQ	92.58	99.65	13.898	14.835	YES
	Verbal Comprehension	94.40	12.950	97.19	23.740	No
	Perceptual Organization	98.36	14.581	100.38	19.552	No
	Working Memory	91.16	14.813	93.52	16.976	No
	Processing Speed	96.22	16.297	97.68	17.231	No
WIAT-II	Reading	90.44	89.78	21.349	18.613	No
	Word Reading	93.82	89.11	19.395	25.973	No
	Reading Comprehension	93.00	96.83	18.596	18.260	No
	Mathematics	91.22	89.00	15.031	15.516	No
	Pseudoword Decoding	86.17	93.11	18.717	16.930	No
	Numerical Operation	83.50	90.11	18.682	16.707	No
	Math Reasoning	90.25	97.89	18.553	19.277	No
	Written Language	94.25	95.25	21.218	32.335	No
	Spelling	90.82	90.44	16.308	15.749	No
	Written Expression	98.78	100.50	24.540	40.583	No
	Oral Language	105.33	124.67	31.660	24.583	No
	Listening Comprehension	92.83	104.14	17.429	16.355	No
	Oral Expression	109.50	122.00	22.128	18.248	No
WJ-III	Letter-word Identification	88.06	94.09	21.621	17.661	No
	Reading Fluency	96.39	96.00	17.711	14.568	No
	Calculation	87.61	88.32	25.292	19.886	No

	Math Fluency	90.29	90.35	17.229	15.560	No
	Spelling	94.22	85.67	19.465	26.657	No
	Writing Fluency	100.29	98.33	17.716	11.782	No
	Passage Comprehension	92.44	92.17	20.086	11.419	No
	Applied Problems	92.36	95.31	12.610	9.700	No
	Writing Samples	89.00	103.25	30.337	13.047	YES
	Word Attack	81.60	89.17	19.463	16.750	No
	Picture Vocabulary	87.00	94.00	4.583	-	No
	Broad Reading	93.89	94.47	20.312	17.458	No
	Broad Math	89.25	91.07	21.706	15.957	No
	Broad Written Language	94.55	96.88	22.682	12.665	No
	Total Achievement	96.80	100.25	13.448	12.176	YES
WRAT-3	Reading	100.95	102.78	16.337	9.862	No
	Writing	97.95	101.00	15.038	11.093	No
	Arithmetic	91.10	101.73	15.461	12.933	No
BEERY	VMI	87.00	81.89	21.691	11.297	No
BENDER	Total Score	116.05	121.23	14.118	8.012	No
BAI	Total Score	13.15	12.42	8.960	.669	No
BDI-II	Total Score	18.00	12.256	15.00	9.624	No
BASC-2-SRP	Attitude at School	58.33	44.75	14.236	6.397	No
	Attitude at Teachers	57.17	47.25	8.329	5.852	No
	Sensation Seeking	53.86	52.00	5.872	7.382	No
	School Problems	58.50	46.75	10.691	4.573	No
	Atypicality	56.67	51.18	12.659	8.483	No
	Locus of Control	62.33	52.00	8.155	7.211	YES
	Social Stress	54.56	52.18	10.596	8.316	No
	Anxiety	58.56	53.64	11.370	10.053	No
	Depression	55.44	49.91	9.876	7.503	No
	Sense of Inadequacy	71.22	52.55	11.977	8.630	No
	Somatization	51.22	50.73	11.872	10.090	No
	Internalizing Problems	61.00	52.27	11.169	7.875	No
	Attention Problems	62.67	55.55	10.689	8.630	No
	Hyperactivity	59.00	50.45	14.133	9.913	No
	Inattention/Hyperactivity	62.44	53.00	13.097	6.018	No
	Emotional Symptoms Index	61.78	52.00	11.099	8.660	YES
	Sensation Seeking	54.00	50.50	7.071	7.635	No
	Alcohol Abuse	57.33	46.83	19.088	2.927	No

	School Maladjustment	58.33	50.33	14.295	8.687	No
	Relations with Parents	38.89	53.73	11.984	9.403	**YES**
	Interpersonal Relations	45.33	48.82	9.631	8.852	No
	Self-Esteem	41.00	50.27	10.428	9.921	No
	Self-Reliance	44.00	48.55	12.390	7.967	No
	Personal Adjustment	40.11	50.73	11.073	8.451	**YES**
	Test Anxiety	62.33	53.71	6.506	7.521	No
	Anger Control	61.67	52.43	6.506	11.148	No
	Mania	50.67	49.29	2.517	6.157	No
	Ego Strength	35.67	49.29	10.786	9.286	No
BASC-2-PRS	Hyperactivity	61.71	60.00	16.550	7.616	No
	Aggression	52.29	57.20	11.686	10.315	No
	Conduct Problems	58.86	69.40	16.507	19.676	No
	Externalizing Problems	58.71	64.50	16.039	12.250	No
	Anxiety	59.86	58.60	12.799	12.249	No
	Depression	64.14	59.90	16.385	9.231	No
	Somatization	58.00	53.60	12.329	7.230	No
	Internalizing Problems	63.29	58.70	14.762	9.464	No
	Atypicality	60.71	55.10	16.449	9.916	No
	Withdrawal	55.00	54.30	17.814	5.272	No
	Attention Problems	58.86	63.10	11.824	6.557	No
	Behavioral Symptoms Index	61.57	61.80	18.174	8.677	No
	Adaptability	40.14	43.67	10.946	10.970	No
	Social Skills	43.29	43.60	9.429	10.480	No
	Leadership	42.86	41.20	10.057	9.659	No
	Activities of Daily Living	42.29	50.00	12.473	10.000	No
	Functional Communication	39.86	44.67	8.009	11.015	No
	Adaptive Skills	40.00	42.00	10.328	11.324	No
	Anger Control	63.00	62.00	13.856	8.485	No
	Bullying	61.33	61.00	17.502	12.728	No
	Developmental Social Disorders	64.67	61.00	13.650	.000	No
	Emotional Self-Control	64.00	60.00	19.468	5.657	No
	Executive Functioning	60.33	64.00	16.743	9.899	No
	Negative Emotionality	60.00	61.00	15.133	5.657	No
	Resiliency	35.33	39.00	12.503	2.828	No

Appendix E

Summary of the Results Among the Child Sample for all Variables Assessed Using ANOVA

Assessment Measure	Variable	Mean Female Score	Mean Male Score	Female Standard Deviation	Male Standard Deviation	Significant Gender Difference
SBV	Full Scale IQ	93.90	93.69	20.663	15.311	No
	Verbal IQ	93.82	94.82	21.662	16.326	No
	Nonverbal IQ	94.78	93.36	19.383	15.547	No
	Fluid Reasoning	96.86	93.77	19.919	18.358	No
	Knowledge	94.08	91.77	19.057	16.159	No
	Quantitative Reasoning	94.73	95.38	19.147	14.664	No
	Visual Spatial Processing	96.53	99.55	18.554	14.012	No
	Working Memory	93.18	94.08	22.178	16.749	No
WISC-IV	Full Scale IQ	92.74	95.03	13.107	17.497	No
	Verbal Comprehension	92.57	96.94	14.418	18.591	No
	Perceptual Reasoning	97.93	99.62	14.798	16.503	No
	Working Memory	92.55	94.28	13.847	15.146	No
	Processing Speed Index	95.91	90.33	13.758	15.014	**YES**
WIAT-II	Reading	90.44	94.89	17.840	22.526	No
	Word Reading	92.42	92.46	17.049	21.888	No
	Reading Comprehension	92.32	95.00	18.586	21.678	No
	Mathematics	92.54	96.92	15.259	17.589	No
	Pseudoword Decoding	87.25	90.29	21.583	18.633	No
	Numerical Operation	87.66	87.38	20.690	18.312	No
	Math Reasoning	89.50	93.67	21.476	19.010	No
	Written Language	92.77	92.54	24.721	22.596	No
	Spelling	93.23	90.58	17.566	19.683	No
	Written Expression	98.19	98.69	22.730	17.984	No
	Oral Language	103.20	101.63	12.471	17.876	No
	Listening Comprehension	99.03	100.31	15.601	18.934	No
	Oral Expression	108.70	103.80	13.627	16.576	No
WJ-III	Letter-word Identification	96.39	16.691	100.36	16.226	No
	Reading Fluency	102.58	16.422	100.13	20.321	No
	Calculation	91.65	17.979	93.03	18.096	No
	Math Fluency	89.80	17.290	90.37	16.901	No
	Spelling	100.15	19.836	98.31	18.803	No
	Writing Fluency	103.59	17.608	100.54	15.560	No
	Passage Comprehension	91.45	14.714	92.72	12.038	No

	Applied Problems	99.91	16.180	101.32	13.855	No
	Writing Samples	107.26	15.926	99.45	13.612	No
	Word Attack	93.00	17.633	101.78	20.614	No
	Picture Vocabulary	95.25	11.442	105.56	13.039	No
	Broad Reading	99.44	98.26	15.818	19.156	No
	Broad Math	97.03	96.67	16.336	15.345	No
	Broad Written Language	103.47	100.98	19.458	16.194	No
	Total Achievement	97.69	97.41	18.909	16.846	No
WRAT-3	Reading	88.43	96.34	15.859	20.043	No
	Writing	88.50	93.97	10.151	20.178	No
	Arithmetic	79.00	82.85	14.817	20.361	No
BEERY	VMI	96.65	93.89	18.882	15.799	No
BASC-SRP	Attitude to School	49.59	48.84	10.513	9.647	No
	Attitude to Teachers	50.81	47.17	11.993	9.700	No
	Sensation Seeking	58.60	50.15	8.105	9.233	YES
	Atypicality	51.89	49.02	11.384	12.666	No
	Locus of Control	50.95	48.80	10.005	9.115	No
	Somatization	55.79	45.42	15.014	6.386	YES
	Social Stress	49.32	47.22	11.190	9.479	No
	Anxiety	48.11	48.94	11.271	9.980	No
	Depression	50.68	48.58	11.302	10.285	No
	Sense of Inadequacy	53.89	49.92	11.744	11.302	No
	Relations with Parents	48.49	52.22	11.796	7.893	No
	Interpersonal Relations	49.19	52.19	11.165	8.833	No
	Self-Esteem	50.32	51.33	10.094	9.317	No
	Self-Reliance	49.92	50.94	9.434	8.654	No
	School Adjustment	51.92	48.31	11.126	9.329	No
	Clinical Maladjustment	50.54	48.47	11.922	10.000	No
	Personal Adjustment	49.22	52.54	11.238	8.098	No
	Emotional Symptoms Index	50.43	47.71	11.261	9.576	No
BASC-PRS	Hyperactivity	53.10	53.74	15.619	13.121	No
	Aggression	54.00	53.59	13.937	12.887	No
	Conduct Problems	56.95	57.47	16.909	17.748	No
	Externalizing Problems	55.29	55.50	16.325	14.848	No
	Anxiety	54.78	53.80	11.249	12.093	No
	Depression	54.68	56.42	14.198	14.171	No
	Somatization	51.72	49.73	13.202	11.536	No
	Internalizing Problems	55.06	54.02	13.058	12.008	No
	Atypicality	54.34	53.30	14.982	12.440	No
	Withdrawal	53.93	52.77	11.403	11.012	No
	Attention Problems	59.47	59.77	14.007	10.078	No
	Behavioral Symptoms Index	57.43	56.93	14.992	13.116	No
	Adaptability	43.45	43.52	9.191	10.630	No
	Social Skills	48.43	45.80	9.774	8.788	No
	Leadership	47.46	46.23	8.751	7.721	No
	Adaptive Skills	46.06	45.01	8.464	8.547	No
BASC-TRS	Hyperactivity	52.34	53.54	10.201	11.637	No
	Aggression	52.26	53.85	11.672	11.653	No
	Conduct Problems	55.35	54.35	14.038	13.391	No

	Externalizing Problems	53.63	54.54	11.356	12.501	No
	Anxiety	54.89	50.79	10.567	9.803	YES
	Depression	53.15	52.66	10.881	10.600	No
	Somatization	49.85	47.89	10.766	7.490	No
	Internalizing Problems	53.15	50.46	10.414	8.253	No
	Attention Problems	58.79	56.13	10.575	10.608	No
	Learning Problems	60.36	55.56	11.005	11.803	YES
	School Problems	60.09	56.27	9.943	11.031	No
	Atypicality	51.43	50.97	9.238	9.304	No
	Withdrawal	53.55	50.88	11.693	7.922	No
	Behavioral Symptoms Index	54.35	54.46	11.484	9.988	No
	Adaptability	45.24	41.97	8.778	10.131	No
	Social Skills	44.43	45.72	8.750	10.661	No
	Leadership	42.26	44.80	8.611	8.062	No
	Study Skills	40.09	44.25	8.469	10.227	YES
	Adaptive Skills	41.60	43.52	8.749	9.784	No
BASC-2-SRP	Attitude at School	52.92	54.89	12.059	11.657	No
	Attitude at Teachers	54.92	55.53	11.442	13.026	No
	Sensations Seeking	53.10	53.00	10.908	13.554	No
	School Problems	54.68	54.72	10.379	10.643	No
	Atypicality	55,24	53.26	14.472	11.870	No
	Locus of Control	54.16	54.00	11.838	11.285	No
	Social Stress	53.68	51.83	13.765	11.853	No
	Anxiety	52.36	53.23	10.177	11.726	No
	Depression	52.52	52.51	11.591	10.998	No
	Sense of Inadequacy	53.40	55.66	13.197	11.177	No
	Somatization	58.50	51.15	13.015	12.419	No
	Internalizing Problems	54.60	54.02	13.506	11.873	No
	Attention Problems	54.04	56.53	11.873	11.493	No
	Hyperactivity	51.92	52.96	10.372	11.296	No
	Inattention/Hyperactivity	53.36	55.28	11.930	11.422	No
	Emotional Symptoms Index	54.28	53.77	12.976	10.833	No
	Relations with Parents	49.64	49.40	10.078	9.200	No
	Interpersonal Relations	47.60	47.28	12.731	12.502	No
	Self-Esteem	45.56	50.34	11.562	10.024	No
	Self-Reliance	46.44	45.45	9.575	9.921	No
	Personal Adjustment	46.44	47.53	11.924	9.731	No
	Test Anxiety	56.00	-	12.977	-	No
	Anger Control	51.33	52.73	12.707	10.248	No
	Mania	48.17	58.18	7.387	11.356	No
	Ego Strength	49.00	59.09	9.721	15.326	No
BASC-2-PRS	Hyperactivity	56.83	55.94	14.952	10.324	No
	Aggression	56.49	53.81	16.134	10.126	No
	Conduct Problems	56.97	54.38	17.016	10.388	No
	Externalizing Problems	57.63	55.19	16.088	9.913	No
	Anxiety	56.00	58.34	14.566	15.955	No
	Depression	61.63	59.51	17.327	14.458	No
	Somatization	55.51	51.77	15.500	12.963	No
	Internalizing Problems	59.69	58.26	16.932	15.628	No
	Atypicality	59.14	58.76	14.111	14.447	No
	Withdrawal	54.60	58.64	12.084	15.425	No

	Attention Problems	56.86	58.49	13.848	9.463	No
	Behavioral Symptoms Index	59.89	59.74	15.459	12.057	No
	Adaptability	43.80	44.44	11.631	10.415	No
	Social Skills	47.14	47.00	12.188	10.573	No
	Leadership	47.74	44.56	11.794	9.606	No
	Activities of Daily Living	44.66	42.51	12.820	9.055	No
	Functional Communication	44.40	43.70	13.772	10.963	No
	Adaptive Skills	44.97	43.33	13.228	9.687	No
	Anger Control	58.12	60.00	17.783	11.233	No
	Bullying	53.00	55.44	17.179	10.013	No
	Developmental Social Disorders	53.29	59.06	16.286	12.093	No
	Emotional Self-Control	55.06	59.94	15.754	11.604	No
	Executive Functioning	53.94	60.74	13.922	12.681	No
	Negative Emotionality	53.76	59.59	14.818	11.147	No
	Resiliency	46.69	40.00	14.089	12.289	No
BASC-2-TRS	Hyperactivity	54.40	57.56	17.458	11.067	No
	Aggression	53.80	58.02	14.454	14.769	No
	Conduct Problems	53.72	55.95	15.021	13.743	No
	Externalizing Problems	54.10	57.87	15.990	13.176	No
	Anxiety	59.35	58.87	17.754	18.942	No
	Depression	60.75	63.44	11.783	14.382	No
	Somatization	54.75	53.36	17.441	12.039	No
	Internalizing Problems	59.95	59.86	15.826	15.101	No
	Attention Problems	54.80	59.89	15.053	7.505	No
	Learning Problems	61.78	59.73	14.996	10.518	No
	School Problems	59.72	59.44	15.533	12.095	No
	Atypicality	53.55	62.78	11.660	16.110	YES
	Withdrawal	56.65	62.80	12.411	14.363	No
	Behavioral Symptoms Index	57.25	63.36	14.689	12.074	No
	Adaptability	44.10	40.64	10.587	8.429	No
	Social Skills	47.10	43.09	11.406	8.557	No
	Leadership	44.33	42.95	7.038	7.211	No
	Study Skills	42.94	41.70	12.129	7.473	No
	Functional Communication	45.89	41.82	8.711	8.619	No
	Adaptive Skills	44.15	40.89	9.438	7.514	No
	Anger Control	53.22	59.29	11.809	8.710	No
	Bullying	50.67	55.92	14.053	10.750	No
	Developmental Social Disorders	54.44	59.83	11.949	9.435	No
	Emotional Self-Control	52.44	57.83	8.156	10.684	No
	Executive Functioning	49.56	57.33	6.464	9.402	YES
	Negative Emotionality	52.33	57.42	9.785	10.367	No
	Resiliency	44.13	41.08	10.274	9.278	No